CHNOLOGY DEPARTMENT

Gas Journal

Vol. 254. 100th Year. LONDON, JUNE 9, 1948. No. 4436. Price 1/-
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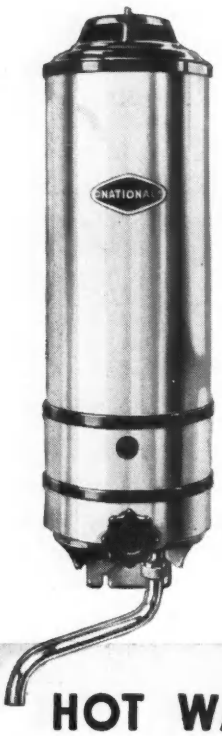

Where "Temporary hardness" is

A PERMANENT FEATURE

The Manager of a Gas Service Department in a hard water area has never quite accepted the word "temporary". He does, however, know that lime is removed more easily from a "National" Water Heater because of the open cone construction — to this extent hardness is certainly "temporary".

NATIONAL WATER HEATER

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GAS SERVICE GOVERNORS

This is an angle type Governor with horizontal inlet and bottom outlet. Can be supplied with ¾" or 1" inlet and the outlet fitted with union and nut suitable for connecting to the inlet of a meter with either 5- or 10-light connections. Can also be arranged for horizontal outlet.

Suitable for Inlet Pressure up to 22" w.g., but can be made for higher pressures if required. The Governor is set for 2·8" Outlet Pressure, but can be weighted to give higher pressures if desired. Capacity—300 cu. ft. per hr., with a pressure loss of less than ½" w.g.

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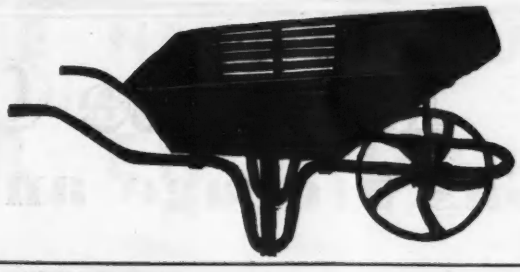
These barrows will take any amount of rough handling. Cochranes have been making tubular framed Steel Barrows for over sixty years and know just what is needed for Gas Works use



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good Gas Works use

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The Liverpool Gas Company has installed A.T.M. Supervisory Remote Indication and Control Equipment in its Central Distribution Control Room and three gas distribution stations.

At the Control Room, instrument readings show gas holder contents, gas pressures and gas flows, and indications, "in" or "out," are given of the distant valves, governors and boosters. Remote selective control of the valves and boosters is provided for and alarm signals are automatically given of gas pressure and gas holder height limits.

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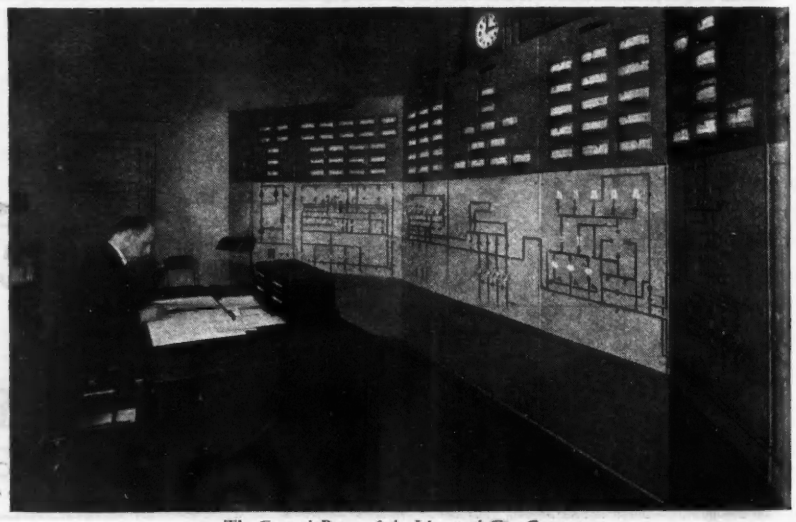
There are many opportunities in the gas industry where the employment of a system of remote control equipment for outlying stations would result in large economies of skilled personnel and manpower.



The Control Room of the Liverpool Gas Company

Plan of Liverpool Gas Company's area showing location of the Central Control Room and three remotely-controlled distribution stations

ATM

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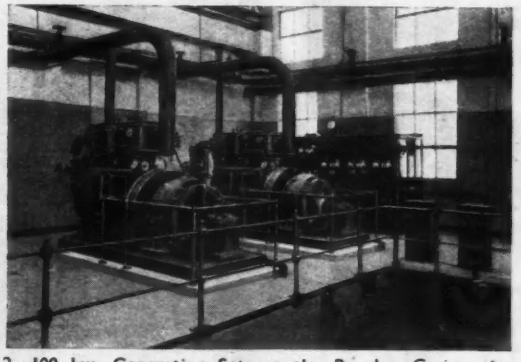

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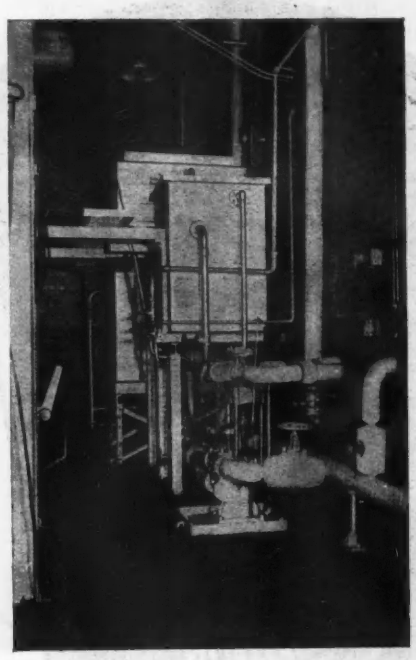

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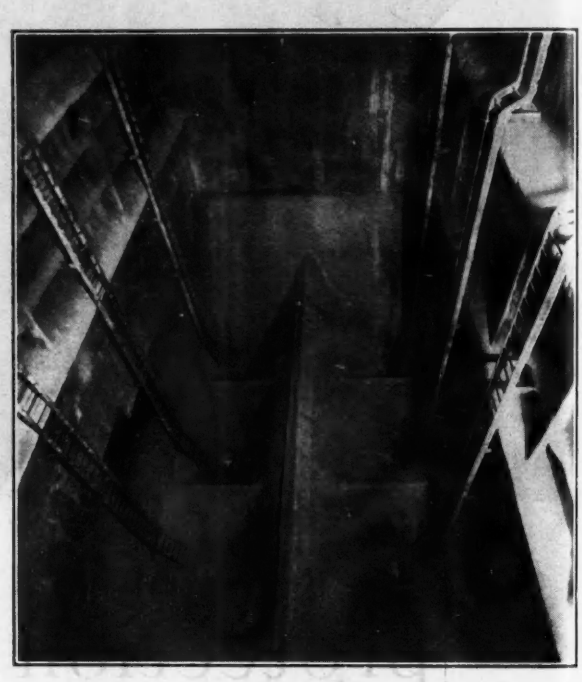

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Whessoe high efficiency vertical water tube primary and secondary coolers, W.W.-D. primary and secondary electro-detarrers, Whessoe rotary washer scrubbers for naphthalene and ammonia removal, and a liquor cooler, together with interconnecting gas mains and valves, plant instrumentation, tanks, etc.

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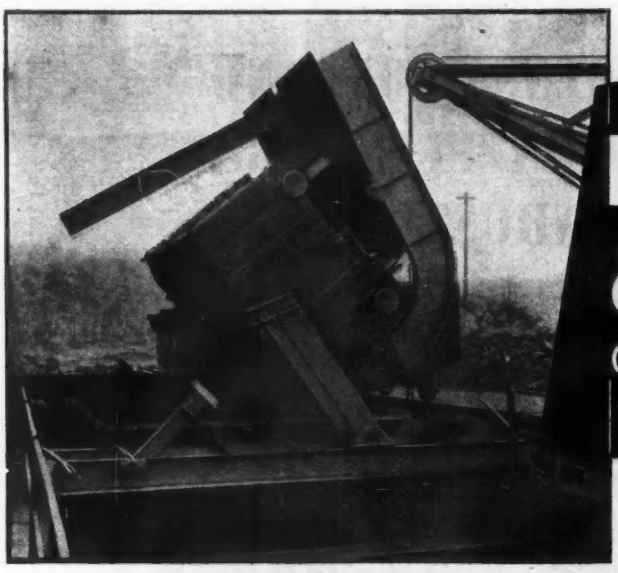

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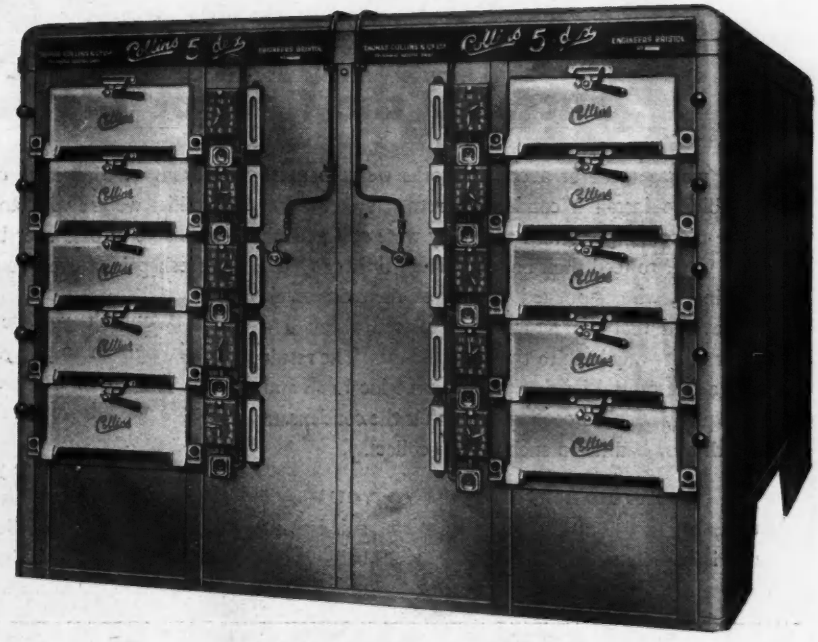

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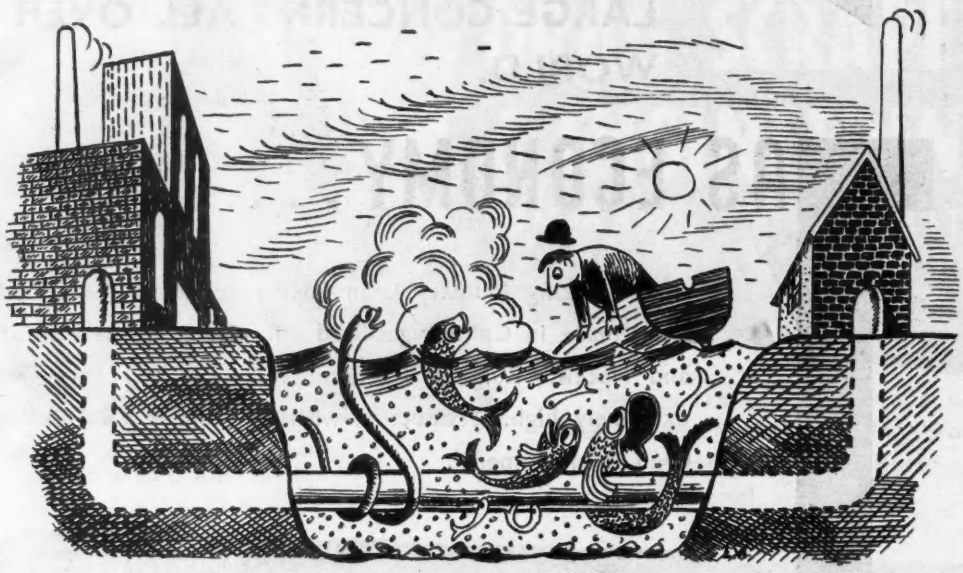
A well-built condensate return system,



but only the fish got the benefit!

The management of a certain works went to great trouble to install a condensate return system, but were discouraged to find that they were still getting cold water to feed their boilers. The Ministry's Fuel Engineer, who happened to hear of their difficulty, discovered that the return main passed through a river on its way back to the boiler house. The result was a fine central heating plant for the local fish and an equally effective cooling system for the condensate which they had taken such care to collect.

THIS WOULDN'T HAPPEN TO YOU!

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Wouldn't you be wise to ask the Ministry's Fuel Engineer to pay you a visit—just in case? Not only is he rich in practical experience, but he can look at the job from a fresh point of view.

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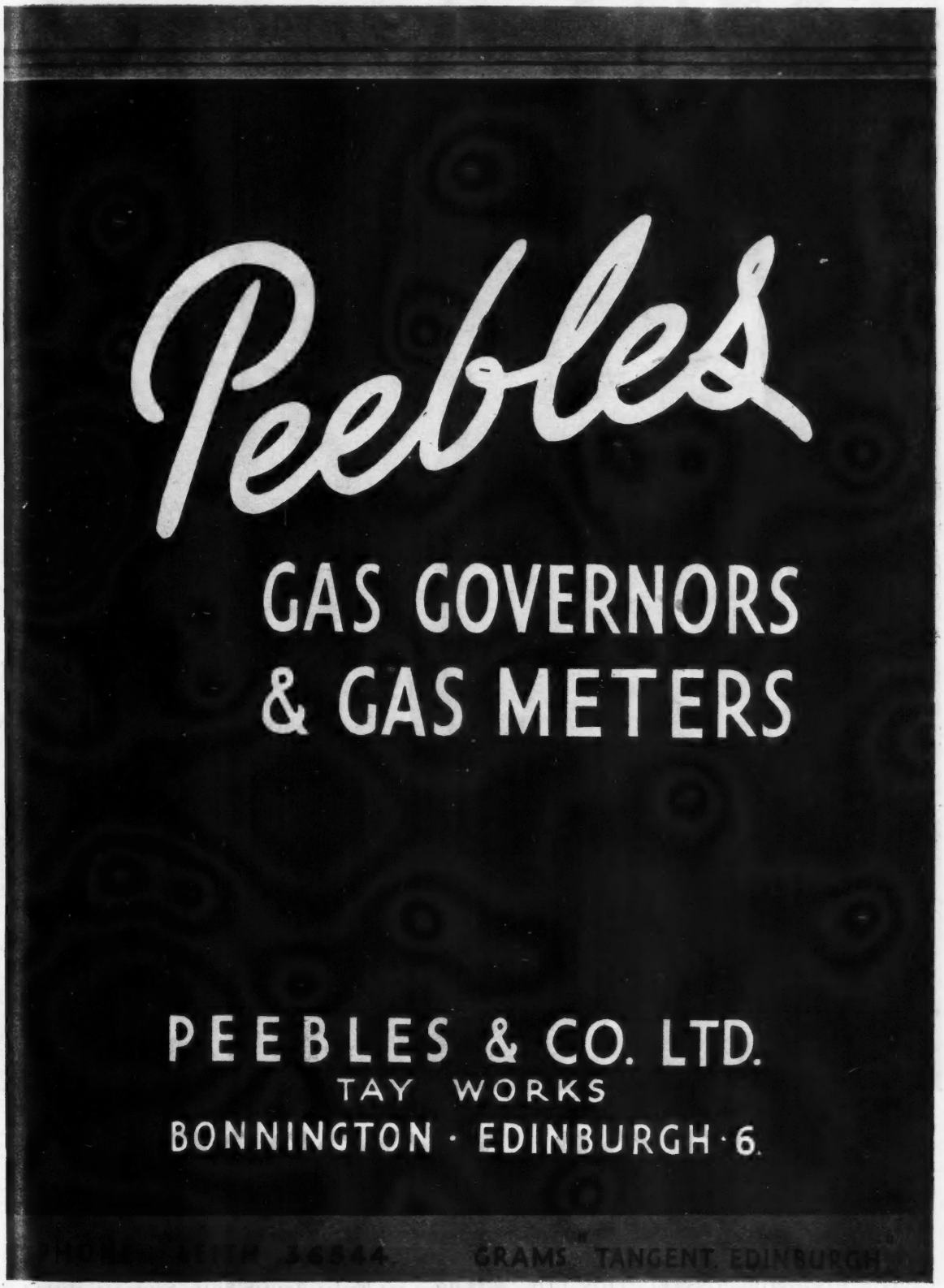
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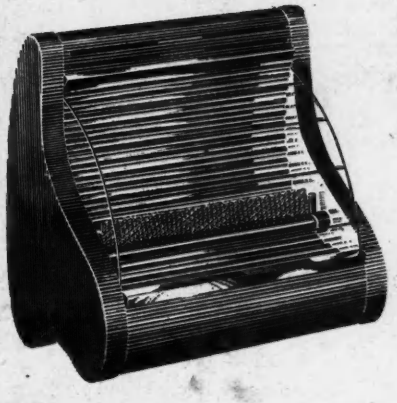
The "WARWICK" PORTABLE GAS HEATER



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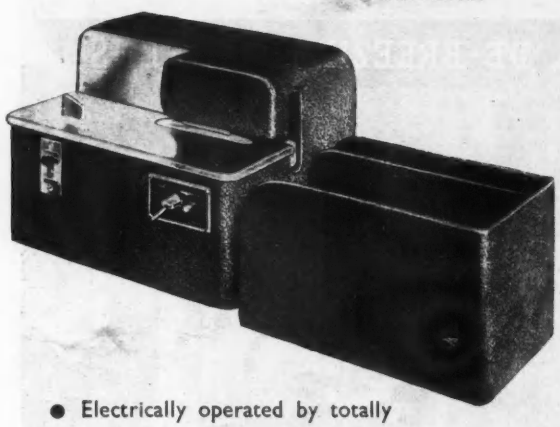

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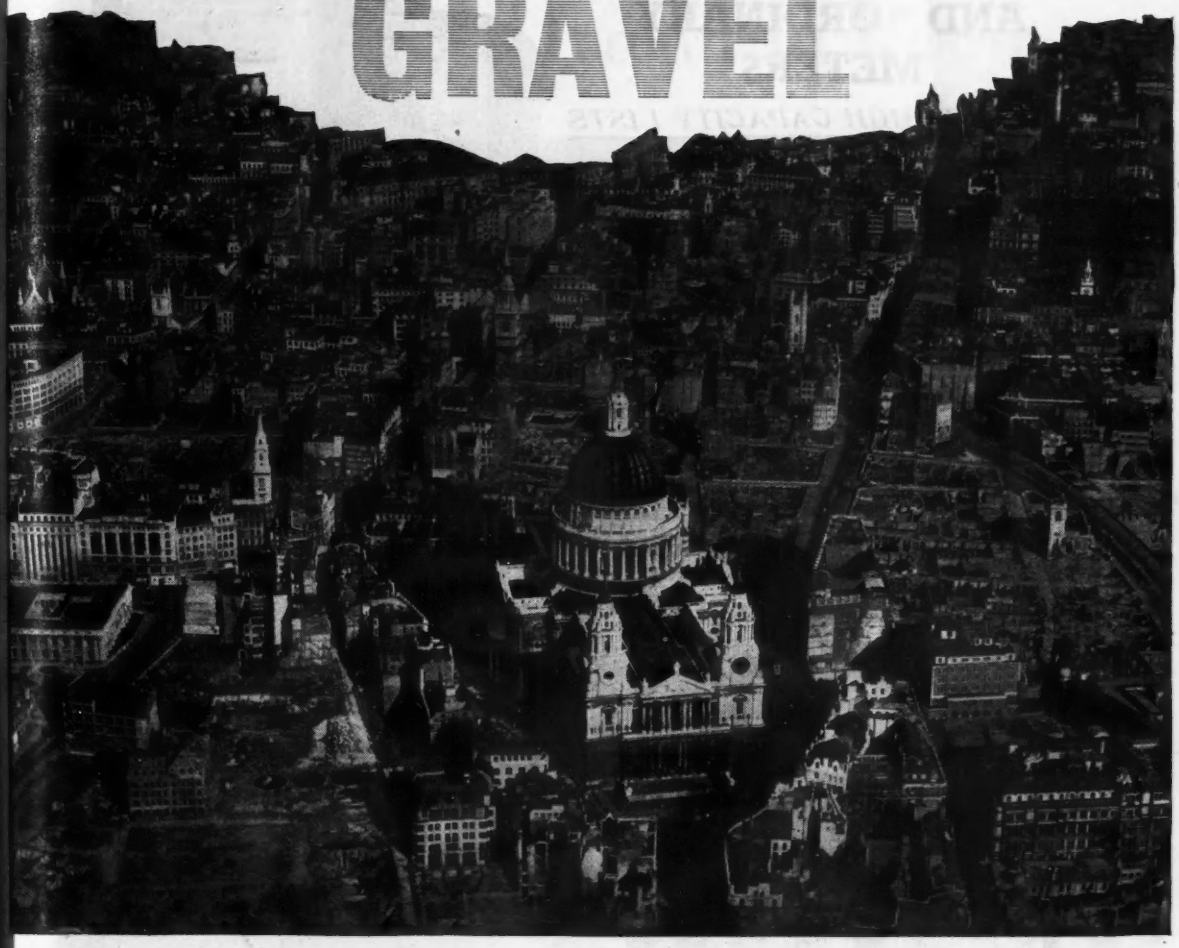

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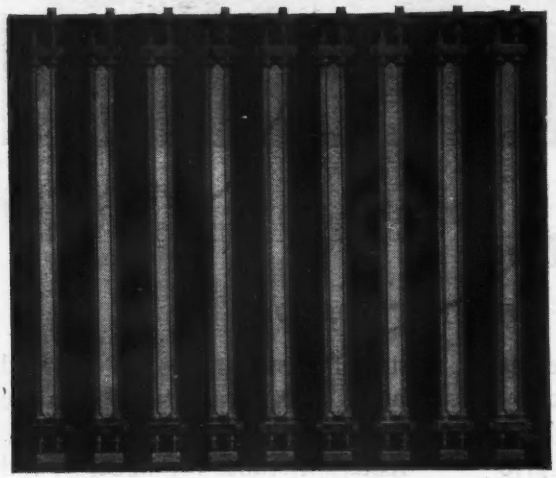

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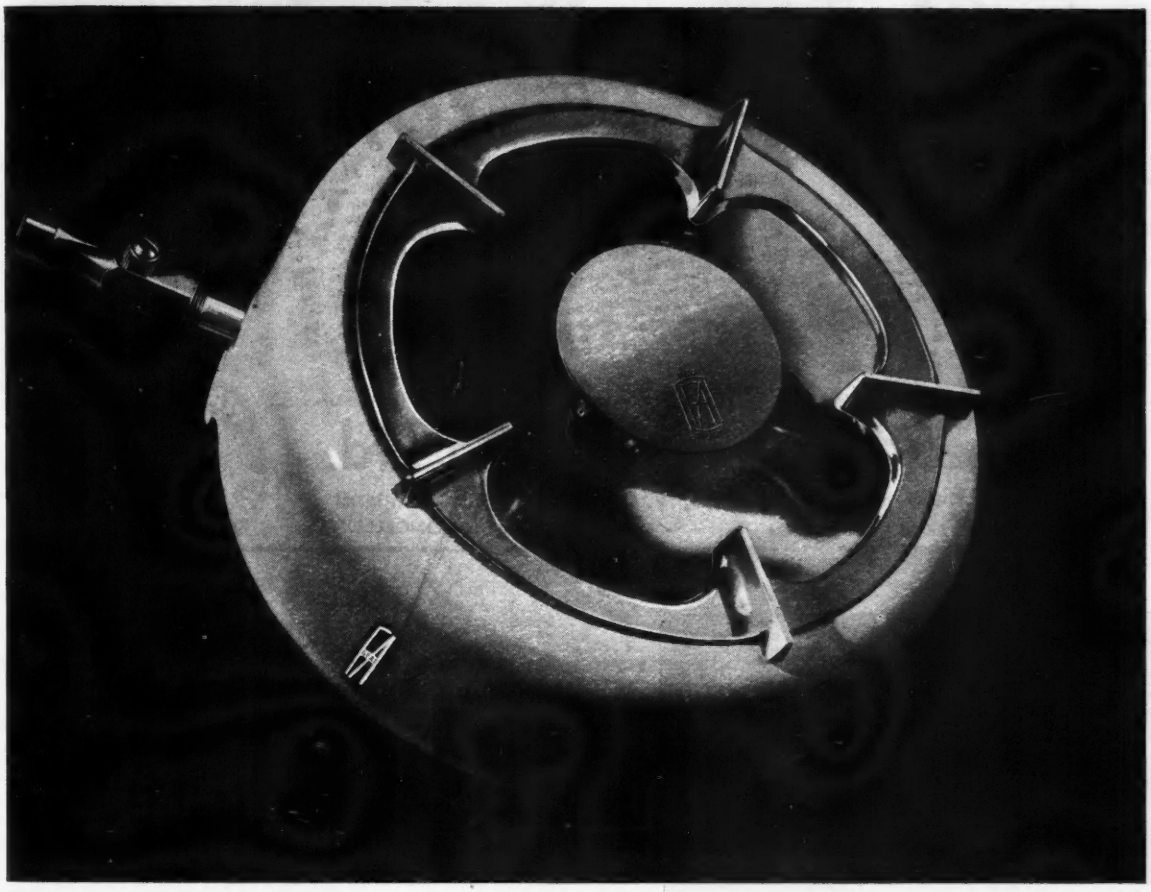

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TYPE FA/1

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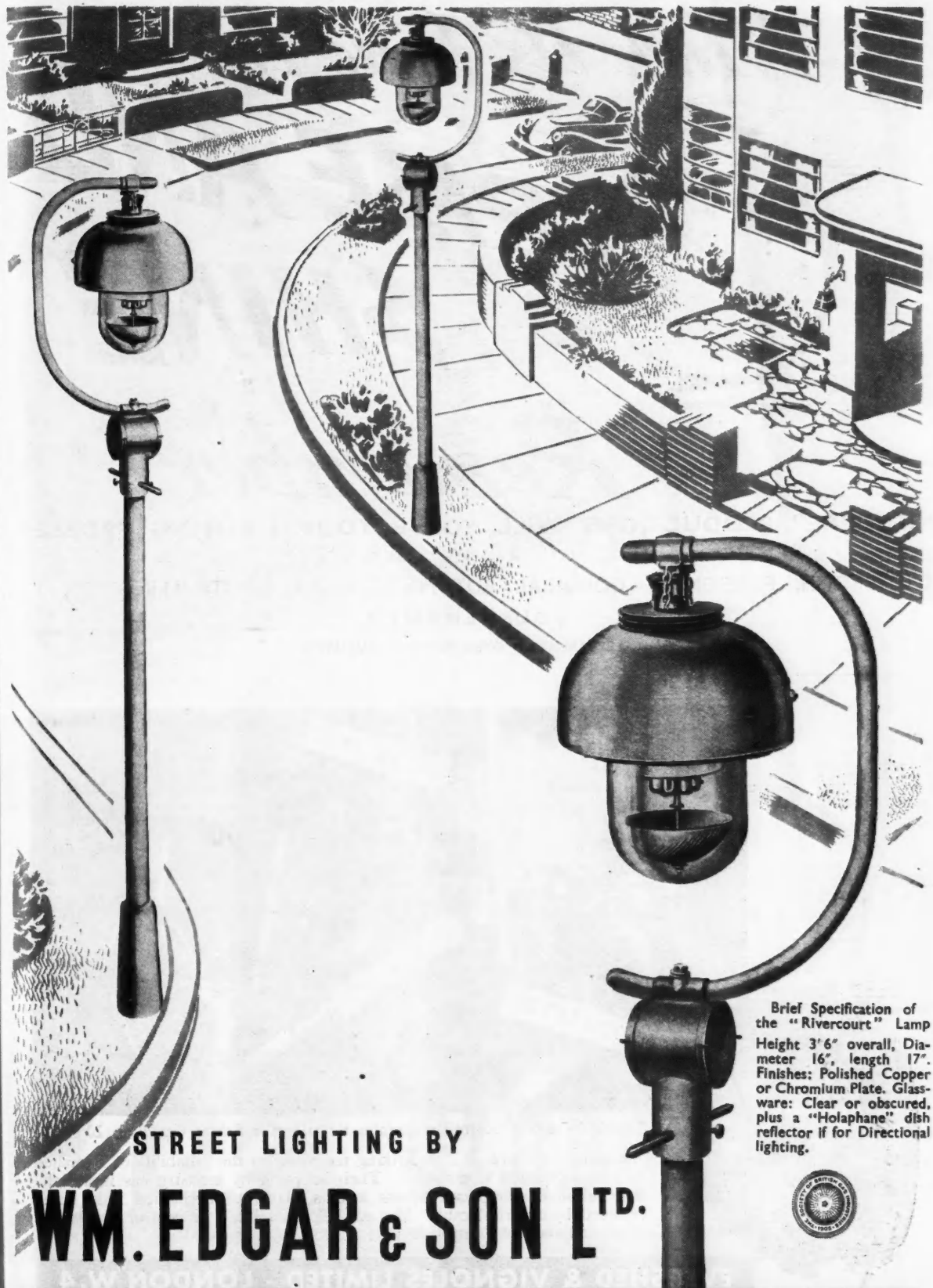

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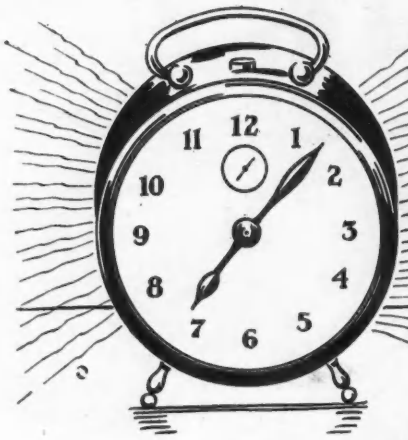

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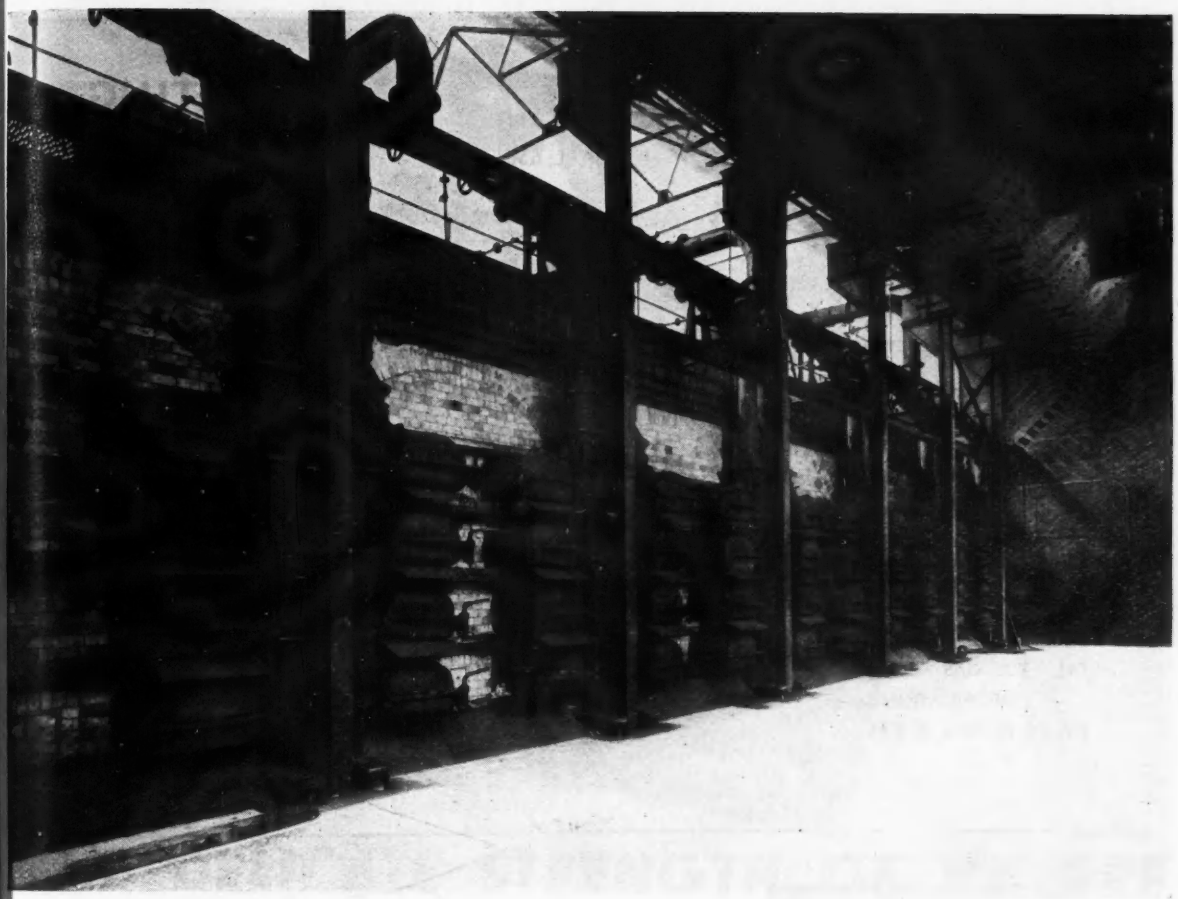

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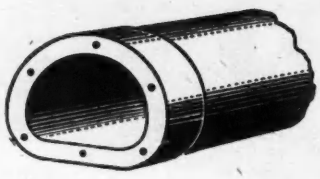

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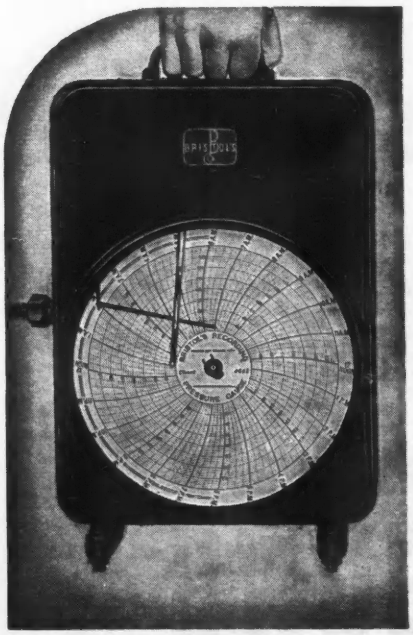

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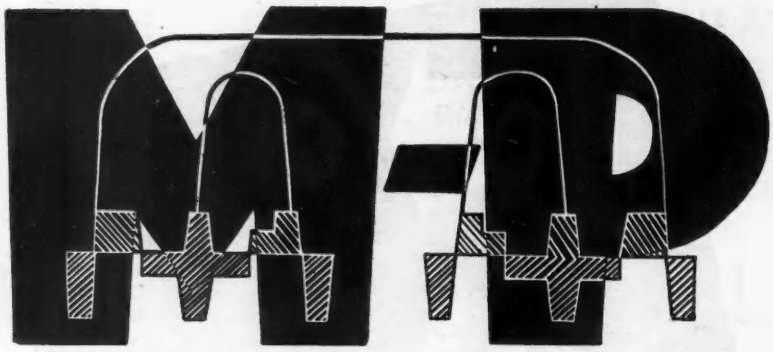

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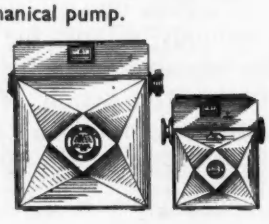

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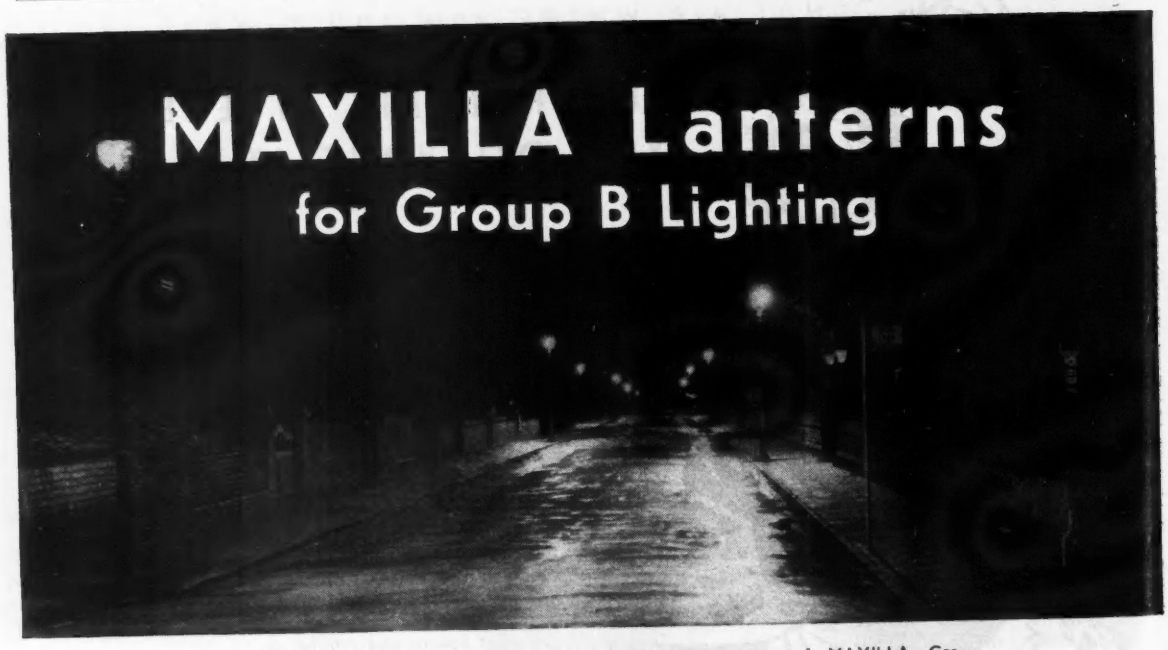

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L.D.5

GAS JOURNAL

Vol. 254 **June 9, 1948** **No. 4436**

GAS SUPPLY AREAS

IN the "JOURNAL" of Jan. 28 last we reproduced the map in the Government White Paper setting out the proposed boundaries of the 12 Areas. In Standing Committee certain amendments were made, and on a later page of to-day's issue we give a further map showing the new boundaries. There has been no departure from previous principles, but it has been agreed that there should be a new Southern Area and that the original South Midlands Area should disappear. The Southern Area consists of the western portion of the old South Eastern Area, part of the South Midlands Area, and part of the South Western Area. The remainder of the South Midlands Area has been divided between the North Thames, the Eastern, and the East Midlands Area. The Lancashire and Cheshire Area has been re-named North Western; the Yorkshire Area has been re-named North Eastern; and the North Midlands Area has been re-named East Midlands. The Report stage of the Gas Bill is to be taken to-day and to-morrow, and the third reading next week. Arising from the assurances extracted from the Government in Committee. the Minister has set down a large number of amendments, and we understand that the British Gas Council has caused to be tabled many others dealing with the more important matters not given effect to in Committee or by the Minister's amendments. Opposition members have tabled some 30 amendments and 11 new clauses for discussion on the Report stage.

In the course of consideration of the Gas Bill in Standing Committee the Minister promsied to publish a list of the companies affected by the provisions of Clause 15 relating to gas holding companies. Certain amendments of these provisions have now been tabled by the Government for consideration on the Report stage of the Bill. If these amendments are accepted the revised definition of gas holding company will cover the following companies:—Severn Valley Gas Corporation, Ltd., South Eastern Gas Corporation, Ltd., Associated Gas & Water Undertakings, Ltd., United Kingdom Gas Corporation, Ltd., Gas Consolidation, Ltd., North Cambrian Holdings, Ltd., North Western Gas Corporation, Ltd., Associated Utilities, Ltd., South Wales Gas Corporation, Ltd., and the Stourvale Gas Company, Ltd.

In an amendment to the Bill tabled on June 2 by the Minister in the House of Commons it is proposed to increase from £2 mil. to £2,500,000 the sum to be paid to local authorities in compensation in respect of the severance of their gas undertakings from their other activities. Prior to the Report stage the Minister will move that the Bill be remitted to a Committee of the whole House in order to deal with 14 Government amendments and one Government new clause. For discussion on the Report stage Mr. Gaitskell has already tabled over 80 amendments, many of which are to meet assurances given in Standing Committee to Opposition members. One amendment for Committee debate allows the base dates in 1945 given in Clause 24 (compensation to security holders) for calculation of security values according to the Stock Exchange Daily Supplementary List to be disregarded if no business is recorded in the List as having been done at any time between Feb. 14 and July 13, 1945. The new Government clause to be brought forward in Committee makes provision for adjustment of reserves of composite companies where at the vesting date assets peculiar to gas or sections other than gas were not directly held in the appropriate section. On the report stage Mr. Gaitskell will move an addition to Clause 5, constituting the Area Boards and Gas Council, laying on the Minister the duty of informing Parliament "as soon as possible after the passing of this Act" of the remuneration and allowances payable to Board and Council members, and in the case of any change, also to inform Parliament. The control of dividends and other payments exercised by Clause 32 is relaxed to the extent of subsection (1) not applying to payments, approved by the Minister, whether before or after making the payment, where the payment was made in pursuance of a recommendation of the directors made on or before Jan. 23, 1948 (date of publication of the Bill). Vesting date, not to be before April 1, 1949, is to be not less than three months after establishment of the Gas Council and all Area Boards, and definition of all areas.

OIL

THE North-West Fuel Luncheon Club has been much concerned with oil, the position of world supply, its possibilities as an alternative to coal for power generation, and, at the May meeting, the results of the exploration for oil in this country. Mr. J. A. Oriel, at the April meeting, pointed out that coal in this country is no longer cheap but that, while oil in the country of its origin is a much cheaper fuel than coal is here, it is not a cheap fuel by the time we get it. To suggest that oil had advantages over coal had hitherto been considered almost unpatriotic. Coal was our indigenous fuel. It provided work for large numbers of people. It was cheap and plentiful. But to-day the situation is quite changed, and it behoves us to examine very carefully the relative efficiencies in the different possible applications to power generation of both coal and oil.

We are all by now only too well aware of the shortage of coal in this country, but apparently we do not all yet realize that there is a world shortage of petroleum. The U.S.A., which for 40 years produced 60% of the world's supply, now imports more than she exports. Russia requires far more than she produces. Oil prospects in Latin America have been explored by a correspondent of *The Economist*. Mexican production little more than meets home demand, and next year may not even do this. Argentina imports half the oil it consumes. Colombia consumes a quarter of its output; Peru about two-thirds; Brazil and Chile import; leaving Venezuela as the only substantial exporter in South America. And it must be clear to everyone that to-day's disturbances in Palestine are reducing the output from the Middle East. Not only, besides, is there is a scarcity in the petroleum

itself. In spite of the wartime expansion of apparatus for the preparation of aviation petrol, refinery equipment is now a bottleneck in the supply of petroleum products. We are thus faced with a shrinkage of supply and growth of demand for both coal and oil.

The relative importance of coal, oil and hydro-electric power is undergoing a significant change. Mr. Oriel made the statement that if the production of power by each of these media in 1920 is given the arbitrary figure of 100, then the corresponding figures for 1946 would be, coal 107, oil 395, hydro-electric 350. These figures are not, of course, comparable with one another, but they serve to show the trend of demand in the several directions.

The question is, to what extent and where oil could be advantageously substituted for coal in this country. The total annual world production of oil is in the region of 400 mil. tons, or say twice the weight of coal production in Britain. The consumption of petroleum in this country is only 15 mil. tons, but of this, half goes into such products as petrol, tractor fuel, and lubricating oil, none of which is used for purposes for which coal is or could be used. Could the remaining 7½ mil. tons be advantageously substituted for coal, releasing more of that for export?

Mr. Oriel makes a somewhat original approach to the discussion. He points out that, while on a purely thermal basis one ton of oil is equivalent to about 1½ tons of coal, there are instances where coal can be used with a much greater efficiency amounting to a much higher ratio of equivalence than 1½:1. There is no such advantage in its use in the large power stations where, though their efficiency is low, the diesel engine with an appreciably higher efficiency is not available in sufficiently large sizes. But the 15 mil. tons of coal used on the railways, for instance, is a different matter. In the United States the number of diesel-electric locomotives increased from 800 in 1940 to over 4,000 in 1947, and it is claimed that the ratio of equivalence with the coal-fired engine is as high as 7:1. With the direct drive diesel of the future it may be higher still. Other examples were given.

Mr. Oriel went on to show that even where one ton of oil is equivalent to only two tons of coal it would be profitable to import oil to replace coal. "Two tons of coal are exported to-day," he said, "for £7 3s., while one ton of heavy fuel oil has an f.o.b. value of £5 3s. 6d., showing an apparent saving of £1 19s. 6d. per ton." And this financial advantage is not merely a consequence of the present unsettled conditions; it existed before the war, and there is no reason to think that, when stable conditions are restored, it will not persist. Apart from the dollar difficulty there seems no reason to distrust Mr. Oriel's argument, applied, be it carefully remembered, to those particular conditions.

If hopes are still cherished in some quarters that some appreciable contribution to our oil requirements may one day be found in this country they would have been dispelled by the authoritative address of Dr. G. M. Lees, of the Anglo-Iranian Oil Company, on May 26. Exploration of oil began towards the end of the 1914-8 war. The new geophysical techniques introduced in the 20's enabled favourable geological formations to be located from the surface, but apart from the borings in E. Notts, where oil was struck in 1939, producing 120,000 tons per year (this has since fallen to 40,000), nothing of any consequence has been discovered. Nor is it likely to be, for, as Dr. Lees put it, there is nowhere in Britain any such a continuous, folded belt as would indicate a true oil-bearing region. It is quite out of the question to expect any major oilfields to be found in this country. The half million tons of oil produced so far is a very small contribution to our needs. That then is the case for oil. What is our reply?

PURCHASE TAX ON WATER HEATERS

As we go to press the clauses in the Finance (No. 2) Bill dealing with purchase tax on gas appliances. We note with intense satisfaction that the British Gas Council has caused to be set down a group of amendments designed to secure the exemption of gas water heaters from the absurd and unjustifiable tax of 100%. The B.G.C., as we have mentioned previously, made representations to the Chancellor of the Exchequer, the Ministry of Fuel and Power, and other Government Departments concerned on this iniquitous ban on water heating in the home—a type of iron curtain against health and common-sense.

BY-PRODUCTS OF CARBONIZATION

In an address to the Fuel Luncheon Club, Mr. W. K. Hutchison, Managing Director of the Gas Light and Coke Company, said there is no doubt that the unique position which coal by-products held in earlier years has gone for good and it will be increasingly important to see that each by-product is treated efficiently at every stage. The sources of supply are necessarily very dispersed and with many of the markets such as road tar and fuel ready to hand, it is not always worth while to concentrate the crude material into large units for further processing. This tendency to dispersal makes it difficult to carry out complicated refining processes, but it should be possible to arrange so that each unit carries the process to the limit which it finds economically and technically possible with a gradual concentration of the resulting products into central units for final treatment and refining. The co-operative schemes for refining tar acids which now operate have shown how this can be done. It is appropriate that at this point in its history the tar industry has seen the need to co-operate in research, and a new research organization has been formed under the joint auspices of the producing and distilling sides of the industry and is now starting to work, assured of unqualified support from all concerned. On the subject of nitrogenous fertilizers, Mr. Hutchison went on to remark that so far as we can see to-day there is an unsatisfied world demand for ammonia as a fertilizer. In the United Kingdom alone the quantity used annually increased from 60,000 tons in 1913 to 560,000 tons in 1947. The output of by-product sulphate of ammonia has been stabilized at round 210,000 tons, and although this does not represent the maximum possible recovery, economic factors to-day are such that any increase in production will be mainly dependent on an increase in carbonization. The large balance of the home requirement, together with the exportable surplus, is accounted for mainly by synthetic ammonia. The history of the by-product ammonia industry has been one of most varied fortunes. Before the first world war when by-product ammonia was practically the only alternative to imported fertilizers such as saltpetre and guano, the revenue from this source was sufficiently attractive to form a significant factor in the economics of processes such as producer gas manufacture and shale distillation. Nitrogen is also an essential ingredient of almost every explosive used prior to the atom bomb, and it was only the development of the Haber synthesis in the 1914-1918 war which enabled Germany to carry on that war. Every country sought to make itself equally independent, with a surplus capacity which could only be taken up in peacetime by fertilizer manufacture. Prices fell to a totally unremunerative level, and even to-day, with the greatly increased demand of intensive agriculture, the carbonizing industries have little incentive apart from the need to dispose of an otherwise objectionable substance.

INDUSTRIAL COAL PROBLEMS

The Industrial Coal Consumers' Council, which includes representatives of the gas, electricity, and steel industries, co-operative societies, trade unions, and distributors, has no executive powers and is limited by Act of Parliament to making recommendations to the Minister of Fuel and Power, but this, as Sir Ernest W. Smith, the Chairman, pointed out at his first Press conference in London last week, is an importance and indeed essential function, and the members of the Council are gratified at the candour they have received from the Coal Board on all the matters they have raised. At a very early stage it was recognized that a big technical and administrative staff would be required if the Council was to make a thorough study of all the requirements of every big coal-using industry, so it was left to the Coal Board itself to hold regular meetings with the industries. The Consumers' Council, shunning publicity, persuaded senior officers and others in the coal industry to talk to the members more frankly than would have been possible if meetings had been held in public, and will in future issue after each meeting a statement of the subjects dealt with. The Council is also required to make an annual report the first of which is nearly ready.

The Council is at present concerned with coal quality. The pro-

portion of dirt in coal brought to the surface is higher than it was in 1939, and the proportion of fines has increased, which means that every available coal cleaning plant will have to be working all out to get the best possible results now. With increasing output short term measures may not do much more than stabilize the position; many new plants will be needed before 1939 standards can be recovered, and such plants cost from £150,000 to £200,000 and take at least 18 months to design, manufacture, and erect. If the coals sent to the coke ovens were better drained of surplus water, steel output could be increased. Sir Ernest gave an assurance that the gas and coking industries had a definite priority for coals and were getting their requirements to the limit of capacity. New techniques were being developed for maintaining coke quality, but he was not so sure whether there would be enough coke ovens in existence in four or five years' time. Plant, he explained, was designed to give maximum efficiency with known raw materials, and if the raw materials varied, output was affected. The most important factor in all large-scale coal using equipment was consistency. He foresaw no material improvement in coal quality for some years, but with increased quantities available it might be less difficult to give industries the coal that best suited them. Sale and supply of coke comes within the purview of the Consumers' Council, and a matter of special importance is the adequate replacement of coke ovens to ensure that the full needs of the steel industry can be met in the years that lie immediately ahead. Asked if he could give any statistics as to the effect of unsuitable coal on the working life of coke oven plants, Sir Ernest said he could not give figures, but his own personal view was that the expectation of life of any given plant might well be reduced from 10 to five years as the result of the use of unsuitable coal.

Letters to the Editor

Co-operation with Traders

DEAR SIR,—I have read with interest the letter by Mr. T. E. Parry, Engineer and General Manager, Cannock District Gas Company, in the "GAS JOURNAL" for May 26, on co-operation with traders

The Domestic Development Committee of the British Gas Council has given consideration to this important item and an *ad hoc* Committee representative of gas supply undertakings and the S.B.G.I. has been formed to examine the whole question of marketing of gas appliances through retail outlets other than gas undertakings. It is hoped ultimately to frame a policy which will be acceptable to all concerned.

Yours faithfully,
TOM BROWN,
Chairman,
Domestic Development Committee.

British Gas Council,
1, Grosvenor Place,
London, S.W.1.
May 31, 1948.

The "Manchester" Purification Process

DEAR SIR,—In view of the publicity which is being given to the question of purification, and in particular to the "Manchester" liquid purification plant, your readers will possibly be interested in the progress which has been made with that process.

The plant is in continuous operation at our Rochdale Road Works and is giving entire satisfaction, in regard both to operation and to working costs. It deals with 2 million cu.ft. of gas per day and no difficulty is experienced in maintaining gas free from H_2S to meet statutory obligations. The production of gas at that works was increased by 50% and, in consequence, it would have been impossible to purify the gas without additional purifiers. I might add that the capital cost of the liquid purification plant is only 60% of that of the dry box system and there is the further advantage of the reduced areas required for the plant. With regard to the operation cost, last month 60,087,000 cu.ft. of gas were purified at a cost of 0.84d. per 1,000 cu.ft. This cost includes wages, materials used in process, electricity, steam, repairs and maintenance, and sundry charges which included minor additions to the plant not normally included in purification costs, less the value of the recovered sulphur. Appended is a detailed cost sheet.

Experience shows that a 75% crude sulphur can be produced which is more suitable for the manufacture of sulphuric acid than spent oxide and commands a price of £4 10s. per ton. On a large-scale plant, a commercially pure sulphur could be produced, and a price of £8 9s. per ton obtained.

There is an impression in the gas industry that the "Manchester" process is in an elementary stage, but such is not the case, and anyone interested can inspect the plant, examine the records, and obtain the desired information.

Yours faithfully,
R. WALKER,
Chief Engineer.

Manchester Gas Department,
Gaythorn,
Manchester.
May 31, 1948.

Cost of Liquid Purification—Month of April, 1948

	Month of April, 1948 £ s. d.
Attendant's wages:	
(Including Worthington's men)	49 15 2
Process materials:	
Copperas	33 0 0
Soda ash	6 14 5
Haulage on copperas and soda ash ...	3 12 0
Electricity	72 19 2
Steam	74 3 10
Repairs and maintenance:	
Materials	17 8 8
Wages	17 8 2
Sundries	10 7 2
Total	285 8 7
Less value of recovered sulphur ...	73 19 0
Net cost	211 9 7
Gas purified (1,000 cu.ft.)	60,087
Cost per 1,000 cu.ft.	0.84d.

Diary

June 17.—**Lancashire and District Coke Association**: Annual General Meeting, Grand Hotel, Aytoun Street, Manchester, 11.30 a.m.

June 18.—**London and Southern Junior Gas Association**: Annual General Meeting. Presidential Address, C. A. Deas. Gas Industry House, 6.30 p.m.

June 19.—**Scottish (Eastern) Junior Gas Association**: Annual Outing, Fife.

June 19.—**Manchester District Junior Association of Gas Engineers**: Ladies' Day, Blackpool.

June 19.—**London and Southern Junior Gas Association**: Ladies' Day. Visit to Hatfield House as guests of the Tottenham and District Gas Company, preceded by lunch at the Cherry Tree Inn, Welwyn Garden City.

June 23.—**Western Junior Gas Association**: Summer Meeting and Ladies' Day. Visit to the Letchworth Factory of Messrs. Ewart & Sons, Ltd.

July 2.—**Waverley Association of Gas Managers**: Annual Meeting, Y.M.C.A. Hall, Edinburgh.

July 14.—**Technical Sub-Committee (Domestic Development Committee)**: 10.30 a.m., Gas Industry House.

July 14.—**Domestic Development Committee**: 2 p.m., Gas Industry House.

June 29.—**Southern Association of Gas Engineers and Managers**: Summer Meeting. All-day visit to the coke oven plant at the Beckton Works of the Gas Light and Coke Company.

Members of the Wales and Monmouthshire Junior Gas Association visited the Stechford Works of the Parkinson Stove Company, Ltd., on June 2. Here members of the party are seen inspecting one of the enamelling furnaces.

Alliance and Dublin Gas Company Players recently produced St. John Ervine's comedy, "Boyd's Shop," in aid of the Dublin Sick and Indigent Roomkeepers' Society.

News in Brief

Middlesbrough Town Council has accepted the tender of W. C. Holmes & Co., Ltd., for the supply and delivery of a gas dehydration plant.

Stockton-on-Tees Corporation has decided to pay an extra 20% to the Gas Department for the supply of gas for street lighting and maintenance.

The Ministry of Fuel and Power has approved the Skegness Gas Department's proposals to reduce the price of gas by 3d. per 1,000 cu.ft. as from July 1.

Sanction Has Been Received by Stockton-on-Tees Town Council to borrow £49,018 for the installation of purifiers at the gas-works. The contractors are Ashmore, Benson, Pease & Co., Ltd., Stockton.

Approval Has Been Given by the Estimates Sub-Committee of Bradford City Council to the proposed £335,170 expenditure on extensions of the gas manufacturing plant at Birkshall Gas-works, Bradford.

Mr. John Freeman, Joint Parliamentary Secretary to the Minister of Supply, speaking at the conference of the Electrical Trades Union, said that the time was not far ahead when gas turbine engines would replace steam in electrical generating plants. The new form of power should be cheaper and quicker and help to compensate this country for its lack of hydraulically generated power.

A Gasholder at the works of the Spalding Gas Department is in course of being dismantled after 53 years' service, and about 100 tons of its iron sheeting and supports will be sold for scrap. The work marks the initial stage in a big reconstruction programme which has been sanctioned for the gas-works. On the site of the holder, with a capacity of 150,000 cu.ft., is to be built a new carbonizing plant.

The Chemical Research Laboratory of the Department of Scientific and Industrial Research is again inviting representatives of industry to visit its laboratories at Teddington, Middlesex. The two open days on which visits will take place are July 1 and 2. Among the main branches of research being conducted at the laboratories are corrosion of metals, coal tar constituents, organic intermediates, and inorganic chemistry. Industrial firms wishing to send representatives should apply to the Director, Dr. R. P. Linstead, at Teddington.

The Annual Dinner of the Association of British Chemical Manufacturers, which was postponed last year in conformity with the Government's wishes, will be held this year on Oct. 13, at Grosvenor House, Park Lane, London, W.1. The principal guest will be the President of the Board of Trade, the Rt. Hon. Harold Wilson, M.P. The Ministry of Food has given special permission for the dinner in view of the important part played by the chemical industry in the export trade drive, and on condition that special emphasis is laid at the function on exports.

The Factory Department has published "Explosion and Gassing in the Cleaning, Examination, and Repair of Stills, Tanks, &c." (H.M.S.O., 4d.). The memorandum contains precautions, most of which have to comply with the Factories Act, the Chemical Works Regulations, and Electricity (Factories Act) Special Regulations. The approved procedure for the cleaning of tar and pitch stills by the Association of Tar Distillers and the A.B.C.M. (Group C) after consultation with the Chief Inspector of Factories, and the precautions in emptying or repairing Gay Lussac towers (as set out in the memorandum issued by the Chief Alkali Inspector in February, 1926) are two of the items dealt with in the memorandum.

An Educational Course of Lectures extending over the past four months was given to 3,000 schoolchildren of 21 schools at Coventry on the manufacture of gas and the utilization of by-products. The course was held under the joint auspices of the local Education Authority and the Gas Department. Thirteen schools took part in a gas-works model competition. Teams of four from each school competed and on May 25 the four winning teams, met by Mr. J. E. Wakeford, Engineer and Manager, Mr. A. E. West, Deputy Engineer and Manager, Mr. D. M. White, Works Superintendent, and Mr. W. J. Steed, Showrooms Manager, were conducted round the city's gas manufacturing plant, entertained to tea, and presented with certificates.

The Ministry of Fuel and Power has published the proceedings of the conference on "Fuel and the Future," held in London on Oct. 8, 9, and 10, 1946, under the auspices of the Fuel Efficiency Committee. Vol. I covers Sections A, B, and C, dealing with the generation of steam, its utilization and drying processes respectively. Vol. II contains Sections D, E, and F, dealing with high-temperature processes, the carbonization and chemical industries, and reports of a special industrial session covering railways, the coal industry, and the sizing and grading of coal. Vol. III covers Sections G. and H, dealing with modern heating and home fuel services respectively. All volumes are obtainable from H.M. Stationery Office, Vols. I and II costing 6s. each, Vol. III 3s. 6d.

Coal and Coke Exports from the ports of Cardiff, Swansea, Newport, Barry, Port Talbot, and Penarth in the period from Jan. 1 to April 18 last totalled 1,657,724 tons, against 1,429,523 tons in the corresponding period of 1947. Patent-fuel exports were 90,804 (48,409) tons.

An Exhibition illustrating the trend of design and technical advancement in post-war domestic gas appliances and of primary interest to members of professions and crafts concerned with housing and equipment of houses was held in the demonstration theatre of the gas showrooms of the Newcastle-upon-Tyne and Gateshead Gas Company from May 31 to June 5.

The "National Gas Bulletin" (Australia), which carries on its front cover the motto: "To the Advancement of the Gas Industry," states that the Public Service Board of Technical Education Branch, Sydney Technical College, has approved the appointment of writers for special subjects for a Correspondence Course in Gas Engineering. Subjects covered are: Gas distribution, utilization, powers and duties of a gas engineer, plans, specifications, quantities and estimates.

Calor Gas (Scotland), Ltd., co-operated with Greenock Gas Department to supply emergency and temporary gas facilities to the new Port Glasgow Estate. This industrial development has been planned to provide employment in the Greenock-Port Glasgow area and has been opened at the earliest possible date to facilitate employment in the area. In view of the difficulties of laying on complete gas services a small number of domestic type cookers were converted and fitted to Calor units. On this temporary service canteen facilities are being provided for the workers in the estate. Town gas will be linked up in due course.

The Secondary Industries Commission of Australia consider that gasification of brown coal produced at Yallourn would assist in relieving Victoria's dependence on New South Wales for considerable supplies of coal, and a preliminary report of two German scientists, brought to Australia by the Federal Government to investigate that possibility, will be submitted to the State Government and the Metropolitan Gas Company of Melbourne. The report suggests that as a preliminary step a pilot plant should be erected to carry out large-scale experiments on gasification of brown coal. This work might be done by the State Government in conjunction with the Metropolitan Gas Company. It is reported that low-grade black coal at Collie (West Australia) is suitable for gasification, and that there is the possibility of transferring gas by pipeline to Perth. The report, we understand, will be submitted to the West Australian Government.

Many Gas Undertakings, as well as hundreds of thousands of consumers, will remember the entertaining film produced before the war by the B.C.G.A., in co-operation with Ascot Gas Water Heaters, Ltd., entitled "Happy in the Morning." It has retained its topicality and the gas industry will be interested to learn that completely new copies have now been taken from the negative. With a little judicial cutting, the film is once again restored to life and will interest audiences who have yet to see it for the first time as well as those who will be delighted to see a revival. "Happy in the Morning" comes as a most welcome addition to the British Gas Council Library, from whom copies can be obtained on loan or by direct application to Ascot Gas Water Heaters, Ltd. The running time is approximately 20 minutes and bookings should be made without delay in view of the already lengthy waiting list.

Sir Stafford Cripps, Chancellor of the Exchequer, is to be principal speaker at the opening lunch of the First National Mechanical Handling Exhibition and Convention in the National Hall, Olympia, London, on July 12. Sir Stafford, as President of the Board of Trade, issued a message to the organizers when they first announced their project stating that the reduction of unnecessary handling is of vital importance and, in a recent speech at Glasgow, he stressed the importance of increased efficiency and economy of effort in industry. The exhibition, which has been organized (by Associated Iliffe Press) on a non-profit-making basis, will include many mechanical handling equipments not previously exhibited in public. Over 100 firms are exhibiting. The full Convention programme gives brief synopses of 17 papers to be read by expert mechanical handling engineers and by the executives of large users of the equipment. The Exhibition and Convention close on July 21.

JOINT COUNCIL FOR GAS STAFFS

A Joint Council for Gas Staffs in the Northern Region has been constituted and held its first meeting in Newcastle on May 28.

Mr. J. F. Jackson, Secretary and Solicitor of the Newcastle-on-Tyne and Gateshead Gas Company, was appointed Chairman of the Joint Council for the ensuing year, and Mr. R. W. Iley, of Sunderland, a staff representative, was appointed Vice-Chairman. Messrs. Alan S. Middleton and R. Douglass, representing the employers' and staff sides respectively, were appointed Joint Secretaries. It is believed that it is the first of the Regional Joint Councils for Gas Staffs to be constituted.

MIDLAND ASSOCIATION PRESIDENT'S DAY AT STOURBRIDGE

OVER 120 members and friends of the Midland Association of Gas Engineers and Managers, including Dr. Harold Hartley, President of the Institution of Gas Engineers, were the guests of the Chairman and members of the Stourbridge Corporation Gas Committee on President's Day—the Spring Meeting of the Association on June 3—when in accordance with long-established tradition, a visit was paid to the works of the President—this year Mr. S. J. D. Williams, Engineer and Manager at Stourbridge. Everything but the weather combined to make the day an enjoyable one. The morning was devoted to an inspection of the gas-works, a description of which was included in Mr. Williams's Presidential Address which was published in the "JOURNAL" of Mar. 31 (pp. 672-675). A strange feature of the works is that although Stourbridge is situated in Worcestershire, the works is neither in the Borough nor the County, but just over the boundary in the Parish of Amblecote, Staffordshire, one of the 12 localities comprised in the Department's supply area of 27 sq. miles.

Dr. Harold Hartley, President of the Institution of Gas Engineers, Mr. S. J. D. Williams, President of the Midland Association, and visitors touring the Stourbridge Works.

After the inspection the visitors were entertained to the luncheon at the Talbot Hotel, at which Councillor F. G. Gregory, Chairman of the Gas Committee, presided. In the unavoidable absence of the Mayor, Councillor H. P. Jones, a cordial welcome was extended by the Deputy Mayor, Alderman Mrs. M. H. Lunt, J.P.

Dr. HAROLD HARTLEY, President of the Institution of Gas Engineers, proposed the toast of "The Town and Trade of Stourbridge" and paid tribute to the town's historical, educational, and industrial associations, mentioning that one of his chief assistants was an old boy of the Stourbridge Grammar School. Like many towns which had developed from the industrial revolution, Stourbridge had its industrial scars, but the fathers of the town had seen to it that industry was concentrated on one side of the town, and its cultural development had not been neglected. The town's industrial interests were wide and varied, being concerned principally with refractories, glass, and engineering. His first personal experience of the town was 36 years ago when as a young man he came to transact some business in regard to refractories for gas appliances. On a later occasion he came representing the same firm, but on the other side of the counter, concerned then with the installation of some glass furnaces. He had been very interested to note how the Corporation Gas Department had progressed under the guidance of Mr. Williams. The gas making

Visitors inspecting the water gas plant.

Midland Association of Gas Engineers and Managers at luncheon at the Talbot Hotel, Stourbridge, on President's Day.

curve had risen steadily over many years. It was perhaps understandable that the output rose from 440 to 660 million cu.ft. per annum in the war years, but it was even more interesting to note that it had since increased to 840 million cu.ft.

The process of integration which was foreshadowed for the gas undertakings of this country would result in the Stourbridge undertaking being one of a group under the West Midland Area Gas Board. Although the undertaking would no longer stand alone, he was sure it would always remain a bright jewel in that somewhat larger setting.

The DEPUTY MAYOR, Alderman Mrs. M. H. Lunt, J.P., responding to the toast, expressed her pride in being a member of a local authority which had the wisdom well over 50 years ago to purchase the gas undertaking. The Corporation was very proud not only of its Gas Department, but of the many other amenities in the Borough. During the fuel crisis of 1947, while cuts were made in electricity supplies, the supply of gas continued—albeit with some slight reduction in pressure at times—and enabled them to warm their homes and cook their meagre rations, thanks in large measure to the excellent work of the Engineer and Manager, their President, and his Assistant, Mr. J. A. Tomes. Many new works had been built in the town, all using substantial quantities of gas, and the gas-works had expanded and met the demand, which, she felt, was a notable achievement. The work at the gas showrooms was started during the time when the late Mr. C. H. Webb was Engineer and Manager, and had been ably carried on by Mr. Williams and his staff.

Councillor F. G. GREGORY, Chairman of the Stourbridge Gas Committee, proposed the toast of the Association. The Corporation and the Gas Committee had, he said, felt it a great honour when Mr. Williams was chosen as President. The Association would celebrate its 70th birthday this year. Whether or not, under nationalization, such Associations would be able to continue to celebrate their birthdays was a matter for conjecture, but whatever the future set-up might be, he felt it would be a tragedy for such an Association to pass out of being. Stourbridge was proud to have the honour of entertaining the Association that day, and he hoped the members would enjoy the rest of the day's programme. The Association comprised a membership extending from Yorkshire to Oxfordshire, and from Nottingham to Herefordshire, and it had rendered untold service to the community. During the war great assistance was given to the Government Departments by the lead given by the organization in the formation of the Regional Gas Engineering Advisory Boards, which helped to raise the efficiency in many works, and introduced a scheme by which gas-works received assistance in the event of enemy action. Since the conclusion of hostilities the Boards had continued to function and had been very helpful to the Ministry of Fuel and Power.

He recalled that the late Mr. C. H. Webb, Mr. Williams's predecessor as Engineer and Manager, was President of the Midland Association in 1916. As the first world war was then in progress it was not until 1924 that the Association paid its official visit to the Stourbridge works. Whatever might be the merits or demerits of nationalization, it would soon be an accomplished fact, but one thing was certain, namely, that the Midland Association comprised men of outstanding ability and achievement in their important industry and they could therefore embark on this experiment with the full knowledge that the industry would be staffed by men who over many years had proved their efficiency and competence.

The PRESIDENT, in reply, expressed his gratitude to the Chairman and members of the Gas Committee who had so enthusiastically supported him in accepting office, and to the members for their co-operation and their attendance on the present occasion. The Association now numbered 135 members, of whom 15 were Honorary, and, as the Chairman had indicated, through its lead in the matter of the Regional Gas Engineering Advisory Boards it had done much to raise the entire standard of efficiency in the industry. He wished finally to thank the members of his staff for their support.

Councillor E. R. R. TOOBY (a member of the Gas Committee) proposed the toast of the Guests, among whom he specially mentioned Dr. Hartley, Mr. George Pearson, O.B.E., Immediate Past-President of the Institution of Gas Engineers, Mr. W. J. Shelley, of the Ministry of Fuel and Power, Mr. R. J. Rogers, President of the Institute of Vitreous Enamellers, Mr. F. J. Edmonds, Regional Officer of the Ministry of Fuel and Power, and the heads of a number of local industrial undertakings. The glass works, he said, were big consumers of gas, and they were especially glad to welcome them among the guests.

Mr. H. J. ESCREET, M.I.C.E., M.Inst.Gas E., President of the Southern Association of Gas Engineers and Managers, briefly replied on behalf of the guests, remarking that from all he had heard of the things to be seen in Stourbridge he wished he had arranged to spend a week there instead of a matter of a very few hours.

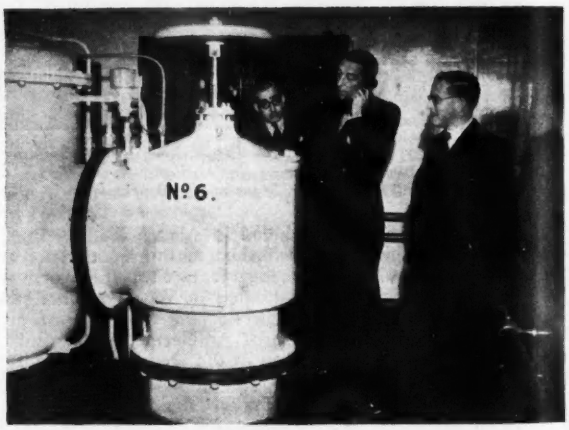
After luncheon the companies divided into three parties to visit respectively the crystal glass works of Webb and Corbett, Ltd., Thomas Webb and Sons, Ltd., and Stuart and Sons, Ltd. The visits were of considerable interest in view of the applications of town gas to the glass industry. Among the special problems arising in connexion with the glass industry is the necessity for the removal of organic sulphur compounds from the gas, and special attention was drawn to the Holmes-Maxted sulphur extraction plant installed in the works of Thomas Webb and Sons, Ltd. (which formed the subject of a paper which Mr. J. A. Tomes, Deputy Engineer of the Stourbridge Gas Department, presented to the Midland Junior Gas Association in 1945, reported in the "JOURNAL" of Feb. 7, 1945, p. 185).

After the visits the members reassembled in the gas-works canteen where they were the guests of the Gas Committee at a buffet tea.

REMOTE CONTROL AT LIVERPOOL

On June 1 the General Manager and Secretary of the Liverpool Gas Company, Mr. C. H. Leach, inaugurated the new automatic and remote control apparatus at the Eccles Street (Vauxhall Road) Gasholder Station of the Company. This distribution centre in the Liverpool Gas Company's system supplies as much gas to the commercial and central districts of Liverpool as would be adequate for a city greater than Chester or a seaside resort of the size of Southport. The whole operation is automatic, the valves, governors, and pumping machinery which fill and empty the holder all being controlled from the central control room at Duke Street, two miles away, and there is no need for attendance at Eccles Street.

The station receives all its gas from the grid mains of the Company, which are connected to the various works which actually make the gas, but if for any reason the grid mains are shut off or the volume of gas reduced, then the automatic station will bring its own stored gas from the holder into use to meet the peak demand.



Mr. C. H. Leach, General Manager and Secretary of the Liverpool Gas Company, calls the Central Distribution Control of Liverpool to instruct them to put into operation the wholly automatic distribution station at Eccles Street, Liverpool. This station, controlling 20,000 c. ft. per hour, has no attendant on the premises.

On June 1 the valves were opened to allow gas into the Eccles Street Station, and when the valves are closed, the holder will begin automatically to supply gas, while the pumping plant will be started automatically to meet the rise and fall in the gas demand by consumers in central Liverpool. As the demand reaches its peak the grid valves open again, the pumping plant stops, and the gasholder fills itself with gas ready for the next peak period.

The whole operation at Eccles Street is in response to the operation of switches or buttons in the control room at Duke Street, which is connected to Eccles Street only by one pair of post office telephone lines. By the use of these same lines, the Control Engineer at Duke Street is able to see by means of his instruments and indicators on the control panel that the whole operation at Eccles Street is proceeding exactly as required. This is the first installation of its size in this country.

Derby Gas Light and Coke Company, with the Ministry of Fuel and Power's permission, acquired the Ambergate, Crich, Bull Bridge and Fritchley Gas Light and Coke Company. Gas supplies for the district served by the Ambergate Company will now be taken from Derby's high pressure gas main from Clay Cross and Blackwell to Derby. The district will be supervised by Derby's Belper Manager, Mr. G. H. Potter. A reason stated for the move was the increased need of gas supplies to a wire works at Ambergate, engaged on wire rope manufacture for colliery use and export.

BULK GAS SUPPLY FROM WESTON-SUPER-MARE

A Record of Achievement

THE Cheddar Gas Undertaking and the Highbridge Gas Undertaking were purchased by the Weston-super-Mare Gas Company in 1933 and 1934 respectively, and during the following year high pressure mains were extended to those two undertakings.

Gas sold by the Weston-super-Mare Company during 1947 was as follows:

	Million cu.ft.	Therms
(*a*) Within the Weston-super-Mare boundary	604	2,869,000
(*b*) To Cheddar and Axbridge districts..	30	142,500
(*c*) To Burnham-on-Sea and Highbridge districts	95	451,250
(*d*) To districts between Weston-super-Mare, Cheddar and Highbridge..	106	503,500
(*e*) Total	835	3,966,250

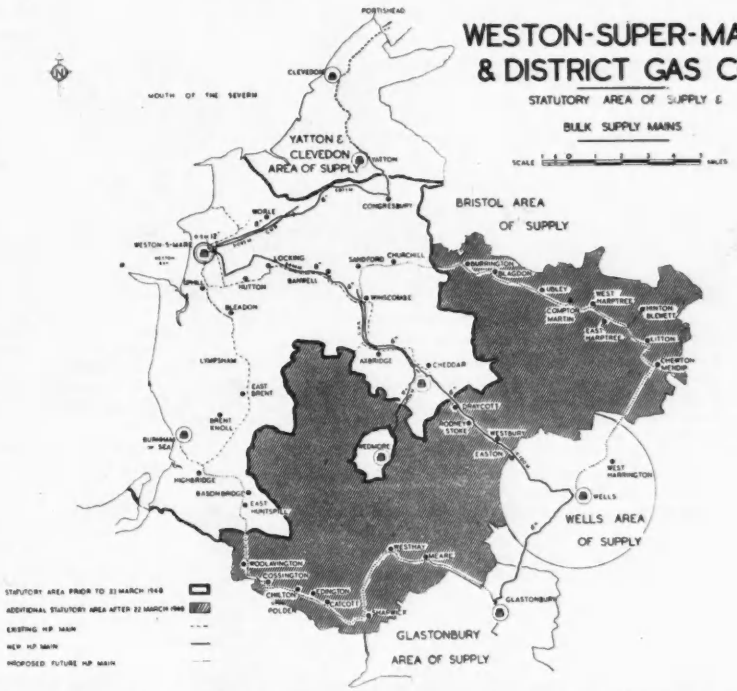
Future Load

In February, 1946, negotiations were commenced with the South Western Gas and Water Corporation for the purchase of the Wedmore Gas Company and the supply in bulk of all the gas required by the Wells and the Glastonbury undertakings; also, during October, 1946, negotiations were commenced with the Yatton and Clevedon Gas Company to supply that undertaking with gas in bulk. The additional load due to these bulk supplies was estimated to be about 325 million cu.ft. per annum (1,553,750 therms).

The Wells and the Glastonbury undertakings required about 200 million cu.ft. and the Yatton and Clevedon undertaking 100 to 125 million cu.ft. per year, the latter figure being approximately 50% of the total gas sold by the Yatton and Clevedon undertaking.

Consequently the gas to be produced at Weston-super-Mare in 1948 was estimated to be 1,275 million cu.ft.(6,056,250 therms) for which additional works plant was necessary. Consequently a fully automatic C.W.G. plant, purifiers, coal gas exhauster, and meter, and a steam driven compressor were installed during 1947.

A second C.W.G. plant and extensions to the coal carbonizing and purification plant are in hand and when completed Weston-super-Mare will supply the entire demand of the Yatton and Clevedon undertaking, being an additional load of 125 million cu.ft. per year (593,750 therms), making the future annual output from Weston-super-Mare 1,400 million cu.ft. (6,650,000 therms).



Bulk Supply Pipe Lines

The maximum day's bulk demand during 1948 was estimated to be:

(*a*) Wells, 300,000 cu.ft.—12,500 cu.ft. per hour.
(*b*) Glastonbury, 400,000 cu.ft.—17,000 cu.ft. per hour.
(*c*) Yatton and Clevedon, 1,000,000 cu.ft.—46,000 cu.ft. per hour.

Referring to the map of the district 347 yards of 12 in. diameter main were laid from the Weston-super-Mare works to a point where the Yatton and Clevedon main branched, and continued with 5.645 miles of 8 in. diameter main towards Wells, completing the line to Wells and Glastonbury with 19.779 miles of 6 in. diameter main. At a point near Cheddar a 4 in. diameter branch line 4.036 miles long was laid to the Wedmore undertaking.

The branch line to Yatton and Clevedon consisted of 3.093 miles of 8 in. diameter main followed by 6.873 miles of 6 in. diameter main which connects with the Yatton and Clevedon undertaking's high pressure system at Yatton.

On the basis of 40 lb./sq. in. initial pressure at Weston-super-Mare these mains provided for an 80% increase on the maximum hourly demand by Wells and Glastonbury and 70% increase on the maximum hourly demand by Yatton and Clevedon.

The delivery of pipes and specials was not particularly easy to arrange and eventually it was decided to install Staveley spun iron pipe with Staveley bolt type flexible joints and Stanton spun iron pipe with Stanton-Wilson joints. The contractors were William Press & Son. All pipes were tested to 60 lb./sq. in. air pressure as laid in short sections and then subject to a second similar test after connecting the shorter sections. The pressure of 60 lb./sq. in. had to be maintained for 24 hours after temperature conditions were normal.

Wells and Glastonbury Pipeline

This pipeline, 25.621 miles long, was commenced on Sept. 10, 1946, and completed on Feb. 24, 1948, the pipe being laid at the average rate of 1.507 miles per month. In order not to incur the heavy expenditure of opening the very narrow road through the ancient village of Axbridge it was decided to lay approximately 4.062 miles of 6 in. main alongside the single track of the Great Western Railway line from Winscombe to Cheddar. Difficulty was also encountered by finding two old roads beneath the existing road for a distance of 2½ miles between Cheddar and Wells which involved expensive excavations in hard core and rock to a depth of 3 ft. 6 in. Otherwise the work continued according to plan, as much use as practicable being made of the grass verge.

Yatton and Clevedon Pipeline

This pipeline, 9.966 miles long, was commenced on June 16, 1947, and completed on Jan. 16, 1948, being laid at the average rate of 1.424 miles per month. Here again, in order not to break open the main Weston-super-Mare to Bristol road more than was necessary, the 8 in. diameter pipe was laid for 2.826 miles at the toe of the embankment of the main railway line from Weston-super-Mare to Bristol. The usual cover of these pipelines alongside the rail track was 2 ft. Continuing to Yatton it was possible to lay 1.027 miles of 6 in. diameter pipe in grass verge and 4.288 miles in the footpath.

Cost of Main Laying

The following tables show the details of the cost of the foregoing work.

Table I shows the analysis and the total cost of the scheme which amounted to:

	£
(*a*) Gas mains and their installation	156,712
(*b*) Meters governors and their installation (partly est.)	5,440
Total cost	£162,152

Table II gives an analysis of the cost of mains installation—*i.e.*, all charges excluding materials as laid under different types of road surface. Such costs exclude permanent surface reinstatement. It

TABLE I.—*Cost Analysis of Bulk Supply Pipe Lines from Weston-super-Mare to Wells Glastonbury, Wedmore and Yatton*

Diameter of pipe in.	Length of pipeline miles	Pipes and joints Total £	Pipes and joints Per mile £	Materials Valves and specials Total £	Materials Valves and specials Per mile £	Sundries Total £	Sundries Per mile £	Contractors' charge for installation of pipeline Total £	Contractors' charge for installation of pipeline Per mile £	Re-instatement £	Total cost Total £	Total cost Per mile £	Type of road surface Grass verge miles	Footpath macadam miles	Railway miles	Road macadam miles	Concrete miles
12	0.197	554	—	78	—	44	—	757	—	85	1,518	—	—	0.147	—	—	0.05
8	8.738	13,828	1,582	1,493	171	712	81	18,607	2,129	1,088	35,728	4,089	3.871	0.541	2.825 (embankment)	1.501	
6	26.652	30,444	1,142	3,533	133	1,568	59	64,092	2,405	8,373	108,010	4,053	6.101	5.442	4.210 (track)	10.899	
4	4,036	2,394	593	395	98	477	118	6,936	1,718	1,254	11,456	2,838	1.872	—	—	2,164	
Total	39,623	£47,220		£5,499		£2,801		£90,392		£10,800	£156,712						

N.B.—Contractors' charges includes trench excavation and re-filling, main laying, and jointing and testing, temporary surface reinstatement and profit. Sundries includes syphon and valve boxes, syphon cocks, standpipes, strainers, and Gas Company supervision.

will be observed that the cost of laying the main alongside the railway track appears attractive.

Table III shows the total cost per mile of 8 in., 6 in., and 4 in. diameter pipe, including all charges with the exception of permanent road reinstatement, when laid under different types of road surface. The conditions of road surface and subsoil are the same as in Table II.

Table IV gives the detail of the total cost per mile of two sections of main laid alongside the railway track:

(*a*) 2.825 miles of 8 in. diameter pipe laid in the toe of the railway embankment.

(*b*) 4.21 miles of 6 in. diameter pipe laid close to the rail lines.

When considering the total cost per mile of pipe laid alongside the railway track the annual "wayleave" charges, amounting to £23

TABLE II.—*Contractor's Charge for Installation of Pipeline under various Road Surfaces per mile of pipe*

Average cover: Diameter of pipe in.	Type of road surface: Grass verge 2 ft.	Macadamed footpath 2 ft.	Railway embankment 2 ft.	Macadamed road 2 ft. 6 in.	
	£	£	£	£	
8	1,700	2,700	2,200	2,900	A
6	1,350	2,200	1,700	2,750 Min.	B
				3,850 Max.	C
				3,380 Av.	
4	925	—	—	2,400	D

Road subsoil:

A—2 ft. 3 in. to 2 ft. 6 in. of hard road metal, remainder clay and stony marle

B—2 ft. 3 in. to 2 ft. 6 in of hard road metal, remainder shale.

C—3 ft. 6 in. of hard road metal.

D—2 ft. 3 in. to 2 ft. 6 in. of hard road metal, remainder marle with large proportion of stone.

Cases B, C, and D include for work in narrow roadways with heavy traffic and consequent oncosts.

TABLE III.—*Total cost per mile of Laying Mains under various Road Surfaces, excluding Permanent Surface Reinstatement. Such figures being applicable to the cost of materials and labour during* 1947

Average cover: Diameter of pipe in.	Type of road surface: Grass verge 2 ft.	Macadamed footpath 2 ft.	Railway embankment 2 ft.	Macadamed road 2 ft. 6 in.		
	£	£	£	£		
8	3,534	4,534	4,020	4,734	A	See Table II
6	2,684	3,534	2,985	4,100 Min.	B	
				5,200 Max.	C	
				4,730 Av.		
4	1,734	—	—	3,210	D	

TABLE IV.—*Detail of cost per mile of Main Laid alongside the railway track with an average cover of* 2 *ft.*

Diameter of pipe in.	Pipes and joints £	Materials Valves and specials £	Sundries £	Contractor's installation charge £	Total per mile £
8	1,582	158	80	2,200	4,020
6	1,142	115	28	1,700	2,985

per mile must be taken into account and it is only economical to utilize the railway track in cases where the length of main is thereby considerably reduced or where the installation costs in any other track are excessive.

Metering

At Wedmore a B.M. meter, capacity 10,000 cu.ft. per hour, was installed in conjunction with a high pressure Reynolds governor arranged to feed direct into the existing distribution feeder main.

At Wells and at Glastonbury B.M. meters each having a capacity of 60,000 cu.ft. per hour were installed in conjunction with 6 in. high pressure Reynolds governors arranged to feed into the existing gasholders.

The Yatton and Clevedon supply was rather more complex because the undertaking required gas at three separate gasholder stations, also gas at a pressure of 10 lb./sq. in. was required at Clevedon for distribution to outlying country districts. It was finally decided to install a high pressure Connersville meter on the Weston-super-Mare side of the boundary of the statutory supply area of the two undertakings.

Compressors

The maximum high pressure load to the Weston-super-Mare undertaking's country districts prior to the bulk supply to Wells, Glastonbury, and Clevedon was 70,000 cu.ft. per hour.

For this load there were two compressors:

One steam driven Bryan Donkin vertical reciprocating compressor, capacity 60,000 cu.ft. per hour against 20 lb./sq. in., installed in 1937.

One electrically driven Bryan Donkin vertical reciprocating compressor, capacity 100,000 cu.ft. per hour against 40 lb./sq. in., installed in 1946.

During 1947 a third unit was installed, being a steam driven compressor of similar type with a capacity of 150,000 cu.ft. per hour, against 40 lb./sq. in.

During 1948 and until the full demand required by the Yatton and Clevedon undertaking is supplied in bulk the maximum hourly demand for compressed gas will be 123,000 cu.ft., the summer load being approximately 80,000 cu.ft. per hour during peak demand. Under such conditions, by taking practical advantage of the available gasholder capacity at all stations, an economic maximum initial pressure at Weston-super-Mare of 20 lb./sq. in., can be maintained during the mid-day peak load, 6 lb. during the night, and 12 lb. during the rest of the day.

Gas was supplied in bulk to Wedmore on Nov. 21, 1947. Wells was supplied on Jan. 16, and Clevedon and Glastonbury on Mar. 6, 1948. The works at Wedmore, Wells and Glastonbury are now closed down.

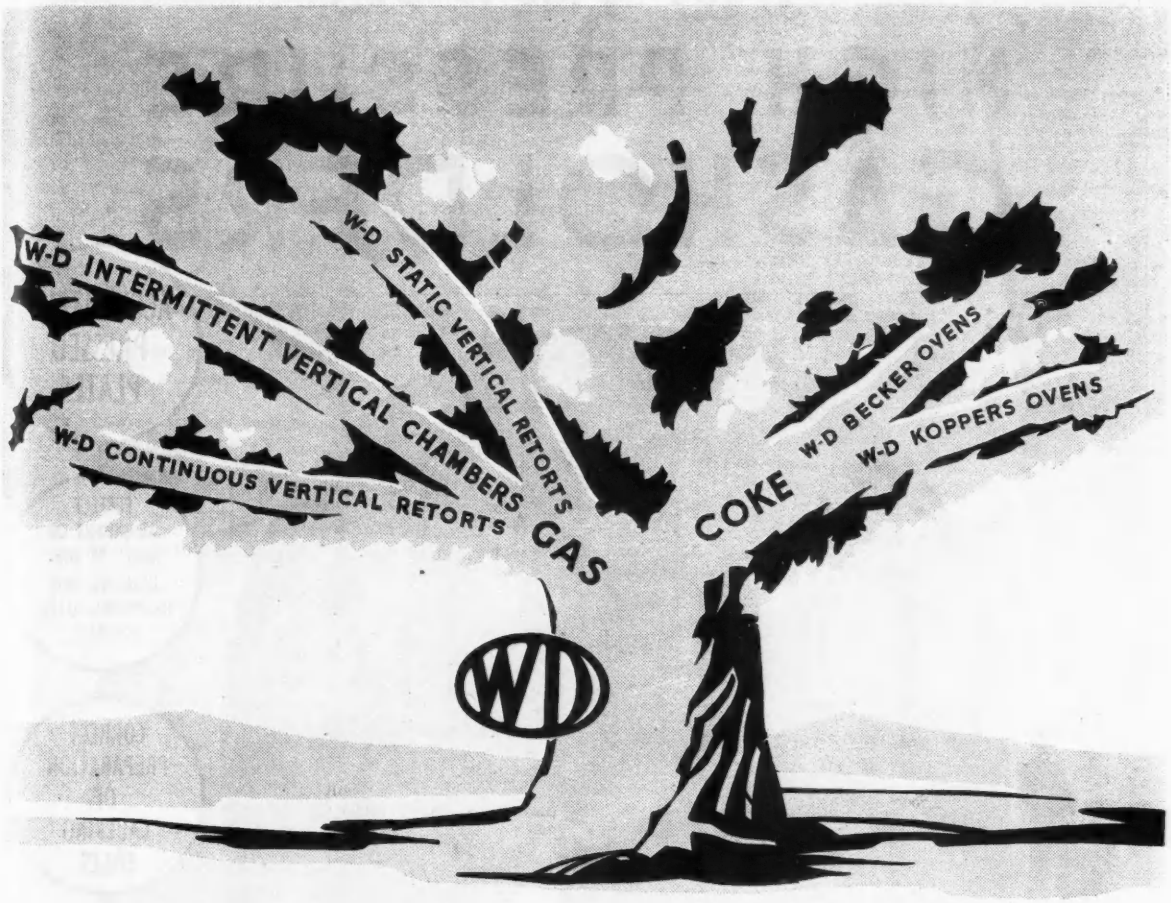
A scheme has been considered which involves the laying of a branch pipeline from the Weston-super-Mare to Wells line through Sandford, Churchill, Burrington, and eight other villages in the Mendip Hills to Wells; also, to extend the Weston-super-Mare to Highbridge pipeline through Woolavington and Cossington and six other villages to Glastonbury. The scheme has been shelved for the time being.

ROYAL DESIGNERS FOR INDUSTRY

The first exhibition of the work of Royal Designers for Industry will be held at Burlington House, London, next October. The exhibition is being organized jointly by the Royal Society of Arts and the Council of Industrial Design. It will show, by practical demonstration and example, the commercial importance of good design and the vital contribution to industry which designers are making.

The distinction "Royal Designer for Industry" (R.D.I.), which may at no time be held by more than 40 designers, is recognized as the highest award to be obtained in the field of industrial design. The distinction was instituted by the Royal Society of Arts in 1936, and the Faculty (Designers for Industry of the Royal Society of Arts) was formed in 1938: its present Master is Gordon Russell, C.B.E., M.C., R.D.I., F.S.I.A., Director of the Council of Industrial Design. It is hoped that this 1948 exhibition of the work of the R.D.I.'s will stimulate production of British goods of outstanding design in time for showing to the world during the 1951 Festival of Britain.

One Hundred Cookers were sold in the first two months after the opening of the new gas showrooms of the Tyldesley Gas Department.



FOR ALL BRANCHES OF COAL CARBONISATION

Just as the sturdy oak grows from an acorn so The Woodall-Duckham Company has developed from the work of the pioneers who built the first W-D Continuous Vertical Retort in 1903. During its 45 years of progress The Woodall-Duckham Company and its Licensees have built Carbonising Plants with a total capacity exceeding 30,000,000 tons of coal per annum.

Today the Company offers to the Gas and Coking Industries an unequalled range of Coal Carbonising Plants.

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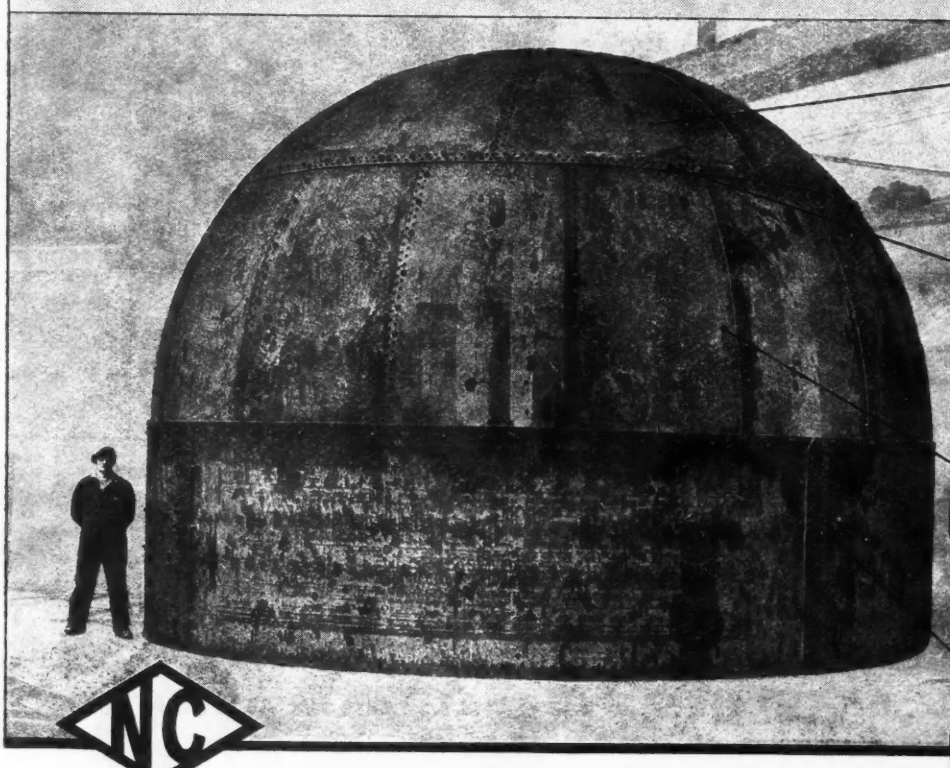
HIGH PRESSURE GASHOLDERS



ACCURATELY PRESSED PLATES

PERFECT ALIGNMENT OF HOLES BY SUB-DRILLING AND REAMERING AFTER ASSEMBLY

CORRECT PREPARATION OF CAULKING EDGES

STIFFENING AND BRACING RINGS CAREFULLY LOCATED

WORKMANSHIP BY HIGHLY SKILLED CRAFTSMEN WORKING UNDER EXPERIENCED SUPERVISION

This photograph shows part of a High Pressure gasholder under construction for a large Gas Company, assembled at our Thorncliffe Works prior to inspection by an Insurance Company.

The Gasholder will be 106 feet long and 25 feet 3 inches inside diameter, working pressure 50 lbs. per square inch and the release capacity 163,000 cubic feet.

The main body plates are 15/16″ thick and the hemispherical ends are 9/16″ thick, whilst the internal framework is of substantial design. The vessel is to be hydraulically tested.

We have adequate, modern, manufacturing and erecting facilities which enable us to carry out work of this type effectively.

Gas Undertakings are invited to send in their enquiries and to consult us on gasholder projects.

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GAS SUPPLY AREAS

IN January a White Paper was published (Cmd. 7313) setting out the proposed boundaries of the 12 Areas and explaining the principles on which these boundaries were based. (The map was reproduced in the "JOURNAL" of Jan. 28, p. 195.) In Standing Committee D certain amendments were made, and the accompanying map shows the new boundaries after taking into account these amendments and a few other minor alterations in the Areas.

There has been no departure from the principles explained in Cmd. 7313, but it was agreed that there should be a new Southern Area, and that the original South Midlands Area should disappear.

The Southern Area consists of the western portion of the old South Eastern Area, part of the South Midlands Area, and part of the South Western Area. The remainder of the South Midlands Area has been divided between the North Thames, the Eastern, and the East Midlands Areas.

The following changes in nomenclature have also been made:

(*a*) The Lancashire and Cheshire Area has been re-named North Western.

(*b*) The Yorkshire Area has been re-named North Eastern.

(*c*) The North Midlands Area has been re-named East Midlands.

Table A incorporates the amendments made in Standing Committee to the First Schedule of the Gas Bill and also takes into account minor changes which will be the subject of Government amendments to be moved at the Report Stage. Table B contains the statistical information appropriate to the new Areas.

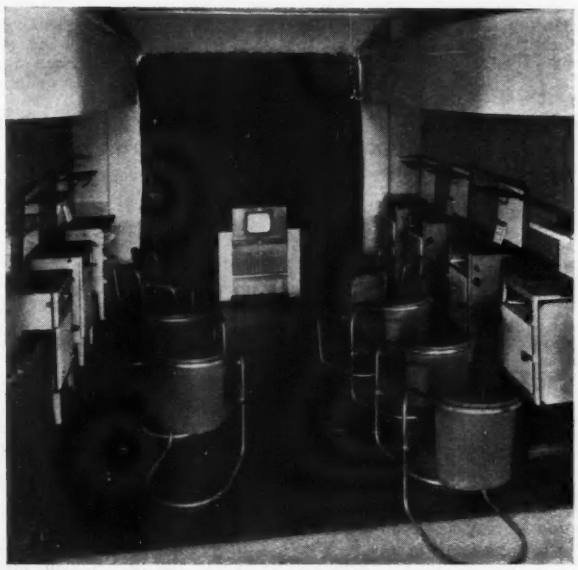
TABLE A.—*Area Gas Boards*

Name of Area Board	Description of Area
Scottish ..	Scotland.
Northern ..	Durham, Northumberland and parts of Cumberland, Westmorland and the North Riding of Yorkshire.
North Western	Lancashire and parts of Cheshire, Cumberland, Derbyshire, Shropshire, Westmorland and the West Riding of Yorkshire.
North Eastern	The East Riding of Yorkshire and parts of the North and West Ridings of Yorkshire (including York).
East Midlands	Lincolnshire, Nottinghamshire, Rutland and parts of Bedfordshire, Buckinghamshire, Derbyshire, Leicestershire, Northamptonshire, Staffordshire and the West Riding of Yorkshire.
West Midlands	Parts of Cheshire, Herefordshire, Leicestershire, Shropshire, Staffordshire, Warwickshire (including Birmingham) and Worcestershire.
Wales.. ..	Wales and Monmouthshire.
Eastern ..	Cambridgeshire, Huntingdonshire, the Isle of Ely, Norfolk, the Soke of Peterborough, Suffolk and parts of Bedfordshire, Buckinghamshire, Essex, Hertfordshire and Middlesex.
North Thames	Parts of the administrative County of London and of Berkshire, Buckinghamshire, Essex, Hertfordshire, Middlesex and Surrey.
South Eastern	Kent, and parts of the administrative County of London and of Middlesex, Surrey and Sussex.
Southern ..	Dorsetshire, Hampshire, the Isle of Wight and parts of Bedfordshire, Berkshire, Buckinghamshire, Devonshire, Hertfordshire, Northamptonshire, Oxfordshire, Somersetshire, Surrey, Sussex and Wiltshire.
South Western	Cornwall (including the Isles of Scilly), Gloucestershire and parts of Berkshire, Devonshire, Herefordshire, Oxfordshire, Somersetshire, Warwickshire, Wiltshire and Worcestershire.

TABLE B

Name of Area Board	Area (square miles)	Population (millions) (mid-1939)	Gas sales (thousand million cu.ft.) (1946)
Scottish ..	30,400	5.0	40.7
Northern ..	6,000	2.8	23.7
North Western	3,900	6.3	59.2
North Eastern	4,100	3.0	24.7
East Midlands	6,400	4.0	41.6
West Midlands	4,800	3.9	54.5
Wales.. ..	8,000	2.5	12.3
Eastern ..	7,200	2.9	21.9
North Thames	960	5.9	61.7
South Eastern	3,300	5.2	44.5
Southern ..	5,700	2.2	21.6
South Western	8,000	2.8	23.2

Figures are approximate only.



Kensington housewives who are not fortunate enough to have their own television sets can see B.B.C. televised cookery demonstrations in their local gas showrooms. The Gas Light and Coke Company are the organizers of this enterprising scheme, and Messrs. Hamptons, of Pall Mall, arranged the installation in the Company showrooms in Church Street, Kensington. A Philco television receiver is used.

HOME SERVICE ADVISERS' CONFERENCE

Mr. J. R. W. Alexander, General Manager of the British Gas Council, opened a two-day conference of Home Service Advisers on the afternoon of June 3, at Gas Industry House. He welcomed 112 advisers representing most of the principal gas undertakings of the country. He said that five-sixths of the population were served by gas in the home, and three-quarters relied on gas for cooking. The local gas undertaking had become an integral part of the community, and home service and home service advisers were important. They were social workers in every sense of the word, for they were trying to raise the national standard of living. They had direct contact with nearly 11 million women, advising them on buying, catering, and cooking of food, on home and family management, and the all important matter of fuel service. Concerning nationalization, he explained to his listeners that, as they were aware, the British Gas Council had opposed and would continue to oppose this project, believing that the integration and development of the industry could best be accomplished, as in the past, without its transference to State ownership. But, if and when nationalization became operative, they had to do their utmost to make it work, for the domestic, industrial, and commercial supply of gas to the public must be maintained without interruption. Mr. Alexander was introduced to the gathering by Mrs. Eileen Murphy, Home Service Officer, B.G.C., and Miss M. Strong (Home Service Consultant, Newcastle-upon-Tyne) thanked the speaker, who briefly replied.

Mr. J. S. Meredith (Shell Chemicals, Ltd.) gave an enlightening talk on "Synthetic Detergents," illustrating it with experiments on the spot; he provoked a great number of questions from the audience. Miss A. K. Wilde (South Metropolitan Gas Company) expressed the listeners' thanks, and Mr. Meredith replied.

Mrs. Joan Robins (Chief Home Service Adviser, Gas Light & Coke Company) in a lively lecture on "Visual Aids in Teaching Nutrition," outlined the importance of visual aids, and demonstrated some forms which these aids could take. She emphasized that the demonstrator should consider the instruction level of her audience, and that instruction was given as part and parcel of the ordinary cookery demonstration. Being up to date in cookery meant being nutrition minded, and the display table could be used for exhibiting foods that "are good for you" She illustrated ways of showing which foods were good for what, and for showing what amounts of a particular type of food had to be eaten per day. She demonstrated how to recapitulate with visual aids at the end of a talk, and thanked Miss P. J. Phillemore (Home Service Adviser, Gas Light & Coke Company) who had been assisting her most efficiently in her demonstrations.

Miss A. E. R. Ashton (Chief Home Service Adviser, Stretford) proposed thanks to Mrs. Robins, who replied, after answering questions. There followed a private session for discussing questions submitted by Home Service Advisers.

On the second day delegates met at the Edgware Road Demonstration Theatre of the Gas Light & Coke Company, when a talk on "Three Ways of Giving a Demonstration," was given by Mrs. P. Macklin (Home Service Organizer, Western Division, Gas Light & Coke Company). Thanks were expressed to Mrs. E. Murphy for organizing a highly successful conference.

Birmingham Discussion Group

The inaugural meeting of the Midlands Home Service Advisers Discussion Group was held at the Grand Hotel, Birmingham, on May 24. The Chair was taken by Mr. F. C. Briggs (Dudley), Chairman of the Midland District Board of the British Gas Council. He was supported by Mr. A. B. Britton (Hinckley, Chairman, Midland District Domestic Development Sub-Committee), Mrs. Eileen Murphy (Secretary, Central Domestic Development Committee), and Mr. W. L. Wright (Secretary, Midland District Board of the British Gas Council).

Home service advisers representing 15 undertakings attended the meeting.

The Chairman opened the proceedings by referring to the valuable services which could and had been given to the Industry by the home service advisers, particularly in relation to promoting the sales of gas equipment and encouraging the efficient use of such equipment which ultimately led to the prime object of the industry, which was to promote the use of gas. He referred further to the benefits that could accrue to the home service section of the Industry under nationalization from such an organization as they had that day met to arrange.

Mr. Britton outlined the sequence of events that had led up to the inauguration of the Discussion Group and said that in this particular sphere it could serve an equally good purpose as that of the Salesmen's Circles, and suggested that in consequence it would be only reasonable for this Group to be represented on the Domestic Development Committee. He thought that this proposal could best be implemented by following the arrangement whereby the Salesmen's Circle was represented on the Domestic Development Committee by co-opting thereto the Chairman of the Group.

After tea the Chairman called upon Mrs. Murphy to explain to the meeting what was being done in other districts in regard to home service advisers discussion groups and to put forward suggestions for consideration by this meeting. Mrs. Murphy explained that the original group had been formed in the London District and that in addition to London and the Midlands there were now groups in the South-Western and North-Western Districts. A Yorkshire group would be formed within a few days. She said that she felt that the prime object of any group of home service advisers should be the improvement of the cooking load, and if this were achieved then the other domestic loads would be increased automatically and proportionately.

Mr. Briggs recommended to the Meeting for their consideration that a Chairman and Secretary should be appointed to hold office for one year and that they might consider it reasonable to work with these two officers only and without a committee. This suggestion was unanimously adopted and on the proposition of Miss E. M. Turner, of Shrewsbury, it was duly seconded and unanimously resolved that Miss O. L. Humphries, of Birmingham, be appointed Chairman.

Miss Humphries proposed, and it was unanimously agreed, that Miss P. J. E. Dodd be appointed Secretary.

The next meeting of the Group will be held on July 5, at 2.30 p.m., in Birmingham.

EASTERN DISTRICT TAR BOARD

The second showing in the Eastern District of the film "Surface Dressing with Tar" was held recently. Some 50 County and Divisional Surveyors and Engineers from neighbouring counties attended at the demonstration theatre of the Ipswich Gas Light Company to witness its presentation by the Eastern District Board of the B.R.T.A. The meeting was presided over by Mr. W. J. Collins Garrard, Engineer and Manager of the Ipswich Gas Light Company, and he was supported by Messrs. J. Davidson Pratt, Chairman of the British Road Tar Association, W. E. Cone (Technical Adviser), and P. S. L. Lee (Travelling Representative).

Mr. Collins Garrard welcomed the visitors and introduced Mr. Davidson Pratt, who prefaced the showing of the film with some explanatory remarks. He stressed the need for the highest efficiency in maintaining roads in these days of economic stringency. The film was produced in order to make more widely known the improvements that could be brought about in the technique of surface dressing with tar, and to do this the human element had been introduced into the film.

Following the showing of the film a healthy discussion took place. Mr. W. E. Cone replied to the many questions which were asked.

Mr. H. J. Berry, County Surveyor of the Essex County Council, expressed the thanks of the visitors to Mr. Garrard, Mr. Davidson Pratt, and Mr. Cone, and the meeting then adjourned for tea.

Successful meetings of a similar character have also been held at Peterborough and Norwich, where the film was very well received by surveyors from the surrounding areas, and members of their staffs. There was an attendance of about 40 at each meeting, and Mr. Lee answered numerous questions raised in the discussions which followed the showing of the film.

At Peterborough, Mr. F. A. Rhead (Engineer and Manager) presided, and at his invitation many aspects of the subject of road dressing with tar and its attendant problems were submitted and profitably discussed.

Mr. R. A. Weston (Engineer and Manager) occupied the chair at the Norwich meeting, and among those who contributed to the discussion was Mr. H. C. Rowley (City Engineer). He suggested that the film might be shown with advantage to gangers employed by the various councils, corporations, &c., and this point was taken up by Mr. Weston, who undertook to make the necessary arrangements if any who were present desired him to do so. It was further suggested that another film might be produced dealing with the surface dressing of urban roads, and also that as a sequel to the present production, a film showing the same roads after 12 months' wear and tear would be of considerable interest.

A special feature of these meetings was the mobile road tar laboratory, in the charge of Mr. E. M. Hinchley, made available for inspection by courtesy of the Midland Tar Distillers, an opportunity which was keenly appreciated.

After tea at Peterborough the surveyors showed great interest in the new 2 million cu.ft. spirally-guided gasholder which is in course of construction, the interior of which was inspected.

The Trade Statistics for April, 1948, just issued by the Department of Industry and Commerce in Eire, show imports of 17,882 tons of gas coal, valued at £85,202, as against nil in April, 1947. This brings the total of these imports for the firt four months of 1948 to 88,163 tons, valued at £385,444, compared with 24,718 tons, valued at £75,288, in the corresponding period of 1947.

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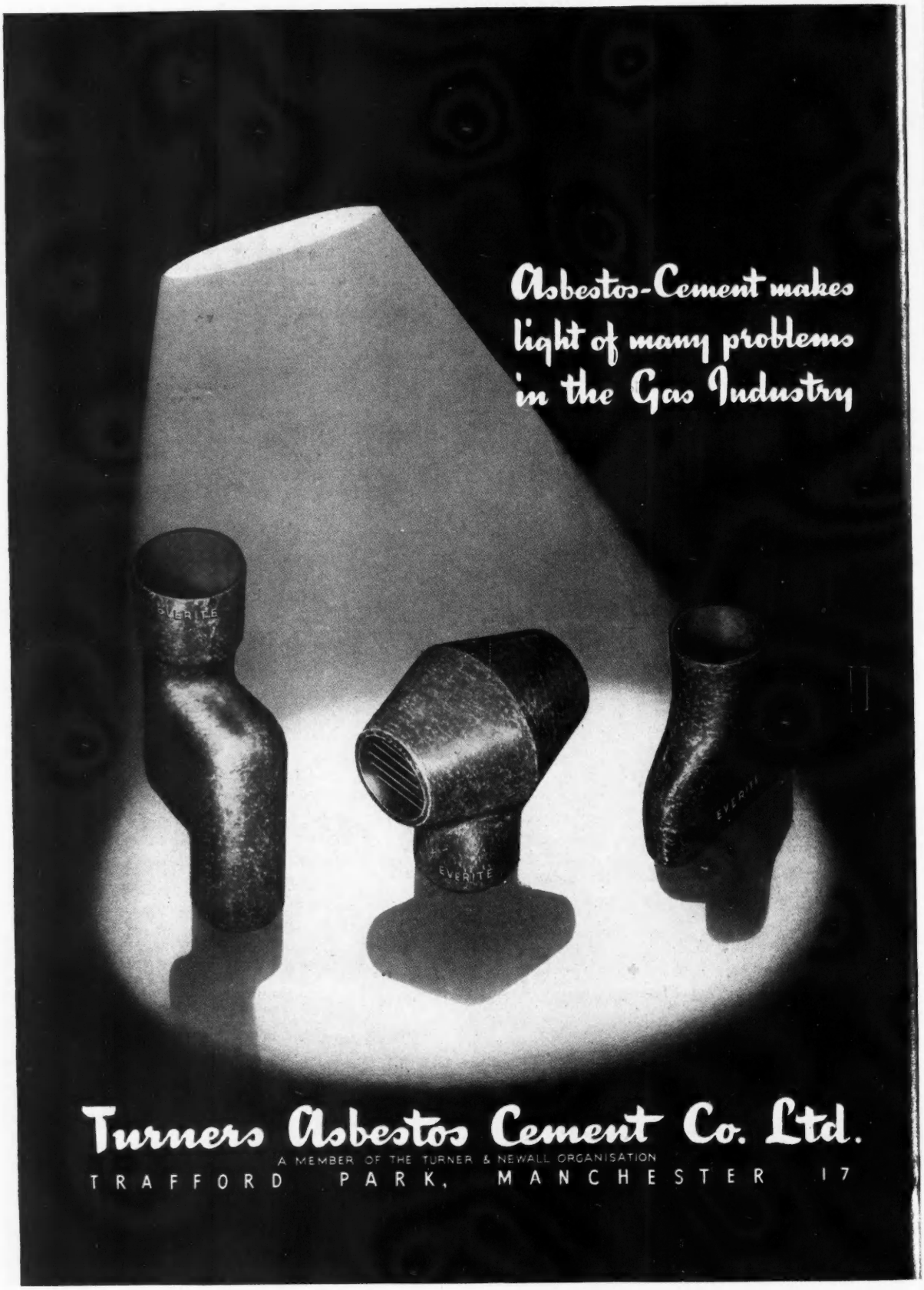
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REMOVAL OF TAR, NAPHTHALENE AND AMMONIA FROM GAS*

BY S. PEXTON, D.Sc., Ph.D., M.Inst.Gas E., G. DOUGILL, M.Sc., F.R.I.C., M.Inst. Gas E., and L. A. RAVALD, M.Sc. Tech., A.R.I.C., Gas Light and Coke Company

THE present paper describes the treatment of crude coal gas prior to hydrogen sulphide removal and discusses some of the problems associated with condensation, detarring, naphthalene removal and ammonia recovery by the indirect† process. An important consideration affecting the complexity and sequence of plant is the liability or otherwise for solid naphthalene to accumulate in the condensers, thus impairing the degree of cooling of the crude gas and limiting the performance of subsequent purifying operations. Solid naphthalene deposits in condensers are almost exclusively associated with gas from coke ovens or horizontal retorts. In contrast, the crude gas from intermittent vertical retorts even when cooled in water tube condensers to 50° F. is unsaturated with naphthalene.‡

It is proposed to discuss the treatment of coke oven gas in the new condensing and ammonia recovery plants of the third and fourth batteries of coke ovens at Beckton. Schemes for the modernization of the plants associated with existing coke ovens and horizontal retorts at Beckton are also outlined.

Ancillary Plant

Fig. 1 represents diagrammatically the flow of crude gas from the gas collecting mains at the coke oven battery to the outlet of the ammonia washers, from which gas then passes to the oxide of iron purifiers for hydrogen sulphide removal. The units of gas treatment plant are as follows:

1. Reversible primary condensers of the water-cooled type.
2. Gas exhauster.
3. First electrostatic precipitator for tar fog extraction.
4. Naphthalene washer.
5. Non-reversible secondary condenser of the water-cooled type.
6. Second electrostatic precipitator for oil fog extraction.
7. Ammonia washers.

This particular order of plant is based largely upon experience with the treatment of gas from the existing Nos. 1 and 2 coke oven batteries at Beckton, and aims at supplying to the ammonia washers:

(*a*) Gas adequately cooled.
(*b*) Gas free from tar fog.
(*c*) Gas unsaturated with naphthalene and free from oily condensates.

These objectives cannot be fully realized if the cooling surfaces of the primary condensers are allowed indefinitely to accumulate solid naphthalene deposits.

Primary Condensers

The problem of designing and operating primary condensers so as to maintain heat transfer surfaces essentially free from solid naphthalene deposits is not new and dates back to about 1890 when carbonizing temperatures were being increased to their present level. The introduction by Dr. Carpenter* of the principle of periodic reversal of gas and water flows through each condenser unit represented a considerable advance in technique and still remains one of the most effective methods available.

The three primary condensers of the third coke oven battery plant are fitted with reversible gas and water valves and to allow for the reduced rate of heat transfer between reversals additional surface area, compared with naphthalene free conditions, has been allowed. Also for the removal of naphthalene deposits from the water tubes of the middle passes, which are likely to be unaffected by normal reversals of flow, it is proposed that occasionally all three condensers shall remain for a time in the gas stream and that the water flow to each in turn shall be restricted to such an extent that the temperature of the gas leaving the restricted flow unit rises to 85° F. The common gas outlet temperature at such times will be increased from 60° F. to about 70° F.

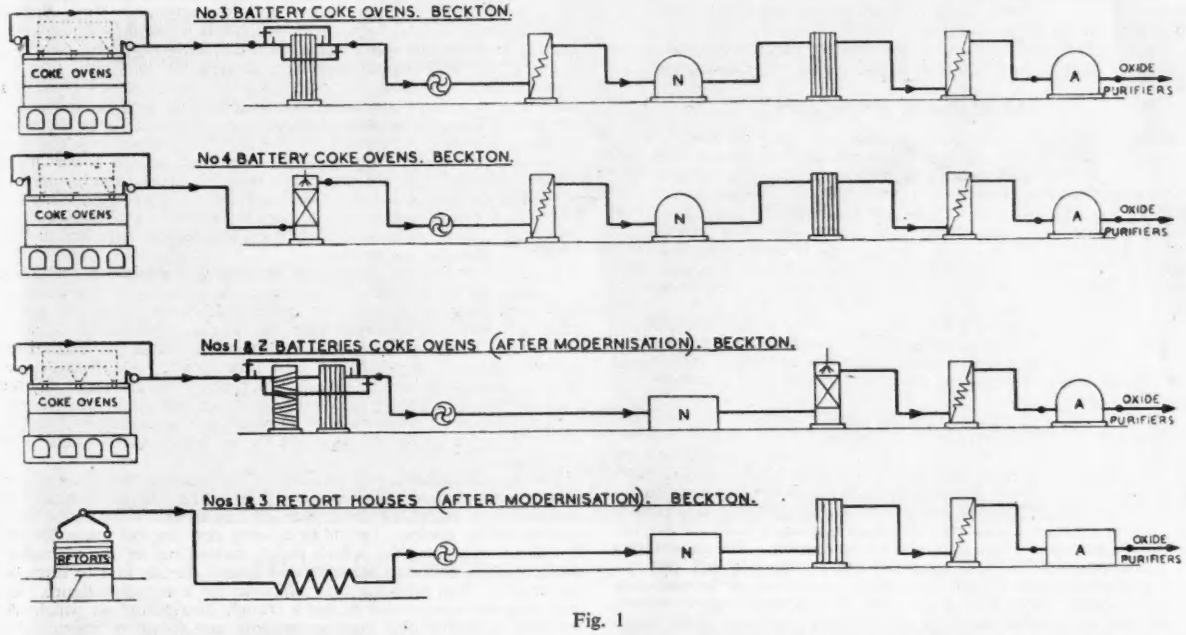

Fig. 1

Gas Exhauster, Electrostatic Detarrer, Naphthalene Washer

From the primary condensers the gas is pumped by a centrifugal exhauster which raises the gas pressure approximately 30 in. W.G. In passage through the exhauster, the gas is superheated by about 5° F. Thus, the normal temperature of the gas at the exhauster outlet is about 65° F. and somewhat higher when the primary condensers are being freed from solid naphthalene deposits. Under such temperature conditions, it is possible to remove naphthalene from gas by oil washing.

Immediately after the exhauster and preceding the naphthalene washer is an electrostatic detarrer which is included in order to prevent

* Presented at the Spring General Meeting of the Southern Association of Gas Engineers and Managers, May 25.

† The *indirect* ammonia recovery process relates to the recovery of ammonia as ammoniacal liquor.

‡ The crude gas from an installation of intermittent vertical retorts carbonizing Durham coal when cooled in water tube condensers to 50° F. contained only 3.7 grains of naphthalene per 100 cu.ft. The vapour pressure of solid naphthalene at 50° F. corresponds to 5.8 grains per 100 cu.ft. of gas at S.T.P. (See Appendix A.)

* C. C. Carpenter, *J. Gas Lighting* (1895), **66**, 1025.

contamination of the washer and wash oil with tar. The naphthalene washer is fed with new gas oil and the spent gas oil from the washer is finally utilized at peak load periods for carburetted water gas manufacture. Gas oil so used for naphthalene washing deteriorates in gas-making quality.

A more suitable means for the disposal of wash oil containing naphthalene and also for rendering the treatment of coke oven gas independent of the main bulk of gas oil used for carburetted water gas manufacture is being provided and should be available shortly. The new process consists in taking the spent oil from the naphthalene washer to a distillation unit specially provided for the purpose of distilling the naphthalene back into the gas stream at the inlet of the primary condensers. The naphthalene will thus be disposed of continuously to the coal tar, and the quantity re-cycled is insufficient to increase seriously the naphthalene difficulties in the primary condensers.

The naphthalene distillation unit at the inlet of the primary condensers is elevated sufficiently for the regenerated oil to return by gravity to the naphthalene washer.

Secondary Condenser and Electrostatic Oil Fog Precipitator

It is now possible to pass the gas which is substantially free from naphthalene to a non-reversible water cooled secondary condenser and to complete the cooling of the gas without the formation of any solid naphthalene on the cooling surfaces. The final gas temperature depends mainly upon the temperature of the cooling water available. Forced draught water cooling towers* to supply water both to the secondary and primary condensers have been provided.

Due to the fact that the gas leaving the naphthalene washer will be saturated with oil which on further cooling in the secondary condensers may create oil fog, it was decided to include an electrostatic precipitator immediately after the secondary condenser and prior to the ammonia washers.

The gas thus enters the ammonia washers adequately cooled, free from tar fog and free from naphthalene and oily condensates.

Operational Experience

Operational experience from the ancillary plant of Nos. 1 and 2 coke oven batteries built in 1929-30 has contributed to the arrangement of the new plant outlined. This plant was required to deal with 16 million cu.ft./day from 60 Koppers ovens. The gas leaves each oven by two 10 in. diameter brick-lined ascension pipes, each of which is led by two right-angle bends and a very short dip pipe into its collecting main. At the top of the dip pipe is a spray feeding some 200 gall. of liquor per hour and at the lower end is the C.I. dish valve which closes under the dip to form a seal when required while the oven is being pushed.

This liquor spray reduces the gas temperature from about 700° C. to 95° C., and the gas, tar, and liquor flow together along the overhead foul gas main to the primary condensers. Immediately before these, the tar and liquor is separated from the gas and flows into two "decantation tanks."

There are four primary condensers each capable of cooling 4 million cu.ft. per day from 170° F. to 90° F. All four are reversible; in fact, they can be run also in two pairs of two in series, though this has not been found advantageous. Cooling to 100° F. brings down weak liquor only, which can then be used for recirculation round the collecting main sprays, while the excess after cooling is available for use for ammonia washing. Durham gas coals yield an average of 14 gall. per ton of virgin liquor on carbonization. The gas entering the condensers at 170° F. is saturated and contains 39 gall. per ton, so that approximately 25 gall. have been evaporated in the collecting mains. Cooling from 170° F. to 100° F. condenses approximately 35 gall. per ton, so that there is a net gain in the volume of the liquor in circulation of 10 gall. for every ton of coal carbonized. The tar and liquor from the primary condensers joins the tar and liquor from the collecting mains and enters tangentially into the decantation tanks. These are vertical, cylindrical vessels 13 ft. 6 in. diameter, with conical bottoms. The tangential entry of some 30,000 gall. of liquid per hour causes a centrifugal action which accelerates the separation of the tar from the liquor.

The liquor circulating pumps draw their supply from the decantation tanks to feed the sprays in the collecting mains leaving the excess of liquor to overflow into a weak liquor storage tank and thence via coolers to the ammonia washers. Tar is withdrawn intermittently from the conical base and flows by gravity through a "pitch trap" to the tar buffer tank. The pitch trap separates the small pitchy lumps which are detached from the dips and collecting or foul mains.

Detarrers

Three 6 million cu.ft. units of Pelouze and Audoin were erected for detarring.

Each exhauster has a capacity of 750,000 cu.ft. of gas per hour, and is direct-driven by a steam turbine at a speed range of 6,000 to 10,000 r.p.m. They act as tar extractors but the exit gas still contains 20 grains/100 cu.ft. of tar fog.

* W. K. Hutchison and E. Spivey. Trans. I.Chem.E. (1942), **20**, 14.

The secondary coolers consist of 12 ft. 6 in. diameter by 74 ft. high tower scrubbers, packed with wooden grids. The liquor circulates through a tubular rack cooler, over which flows filtered river water, and enters the secondary cooler by sprays of the type which impinge on a splash plate.

Three 12-bay rotary ammonia washers in parallel, each of 10 ft. 6in. diameter and capable of being fed with weak liquor or water or both, are used for ammonia extraction, after which the gas passes to the eight streams of purifiers.

Working of the Plant

The primary condenser system worked well, yielding liquor of approximately 1.6 oz. free and 2 oz. fixed ammonia regularly. The strength was reduced after circulation round the collecting mains to 1.2 oz. free, which has a low partial pressure of ammonia and is a useful washing liquor.

Some trouble was experienced with the decantation tanks, which were designed to give a constant tar overflow but which blocked continuously. A device consisting of a chain passing down the centre of the tank, up the tar outlet, and back via a winch, enabled blockages to be cleared, but the lowered temperature of the cone indicated an accumulation of solids that boded ill for the future. Fortunately a simple alteration of procedure effected a complete cure. The tar outlet was lowered and instead of running off tar slowly and continuously, it was drawn off at full bore twice per shift. This carried up the small bits of pitch, &c., and over a period of 16 years these tanks have never required cleaning.

A little trouble was experienced between the outlet of primary condensers and exhausters both in the mains and tar extractors, particularly if the temperature at the outlet of the primary condenser was allowed to fall below 85° F. Solid naphthalene deposited without any solvent oils or tars. A few warm liquor sprays soon cured this.

The final coolers and ammonia washers worked extremely well at first, giving high strength liquor and low ammonia slip. Several troubles, however, developed at an early date in the liquor circulation round the secondary gas coolers and rack coolers. These were that traces of tar and naphthalene were carried by the liquor into the liquor cooler, impeding heat transfer and causing partial blockages. Men had to be kept continuously engaged in cleaning the tubes, and the incomplete cooling allowed solids to be deposited in the ammonia washers, reducing their efficiency. A further trouble that occurred was the deposition of almost pure white naphthalene flakes in the 48 in. outlet main of the secondary coolers. This naphthalene was proved to consist of flakes precipitated from the gas by cooling but which had not deposited on the cooling surfaces, and consequently floated out of the cooler with the exit gas and settled at the first change of direction in the gas mains.

To cure this trouble an unusual method was worked out which is not suggested as of general application but certainly helped to make this plant very successful over the last 15 years. Gas oil, partly saturated with naphthalene from the works naphthalene washers, was added each day to the liquor circulation. This oil reduced the naphthalene in the gas below saturation point. All deposits and troubles with cleaning the liquor cooler disappeared. Each day the excess make of liquor overflowing from the secondary coolers was accompanied by a proportion of oil which was separated by decantation, the liquor going to store and the oil to the carburetted water gas plant.

Two smaller troubles still persisted. The first was that as oil is used as a cooling medium, it necessarily follows that the gas is saturated with oil vapours, which are condensed and form oil fog in the later sections of the cooler. In addition, some very fine oil spray, formed by the oil impinging on splash plates, passed out of the secondary coolers to the ammonia washers and caused an oily film to form on the brushes, thus reducing their efficiency to a very low figure. By removing the sprays and fitting a trough distributor* in which the oil flows smoothly over surfaces without any splash or impact, this trouble was minimized.

Apart from these small practical difficulties, but with the modifications enumerated, the plant has worked successfully and continuously for 16 years, including the six war years, treating some 80,000 million cu.ft. of gas and producing 50 million gall. of tar and 150 million gall. of liquor. When, however, the question arose of erecting a further plant of similar size (but in two units), to be followed by the overhaul of the present plant during battery resetting, further refinements and improvements were sought.

No. 3 Coke Oven Battery Ancillary Plant

The standards desired in the cooling, condensing, and ammonia extraction of the crude gas were arbitrarily chosen as follows:

Final gas temperature :	Summer	Preferably below 60° F.
	Winter	Not lower than 45° F.
Ammonia :	Summer and winter	5-10 grains slip while maintaining liquor strength at 15-20 oz.
Tar fog :	Summer and winter	Below 1 grain/100 cu.ft.
Naphthalene :	Summer and winter	Below ½ grain/100 cu.ft.

Achievement of these conditions implies the provision of cooling plant ample for cooling the full make of gas in hot weather, and therefore also implies that the cooling section must be worked partially or at low capacity in winter.

* Gas Light and Coke Company and Silver, B. P., 487, 946.

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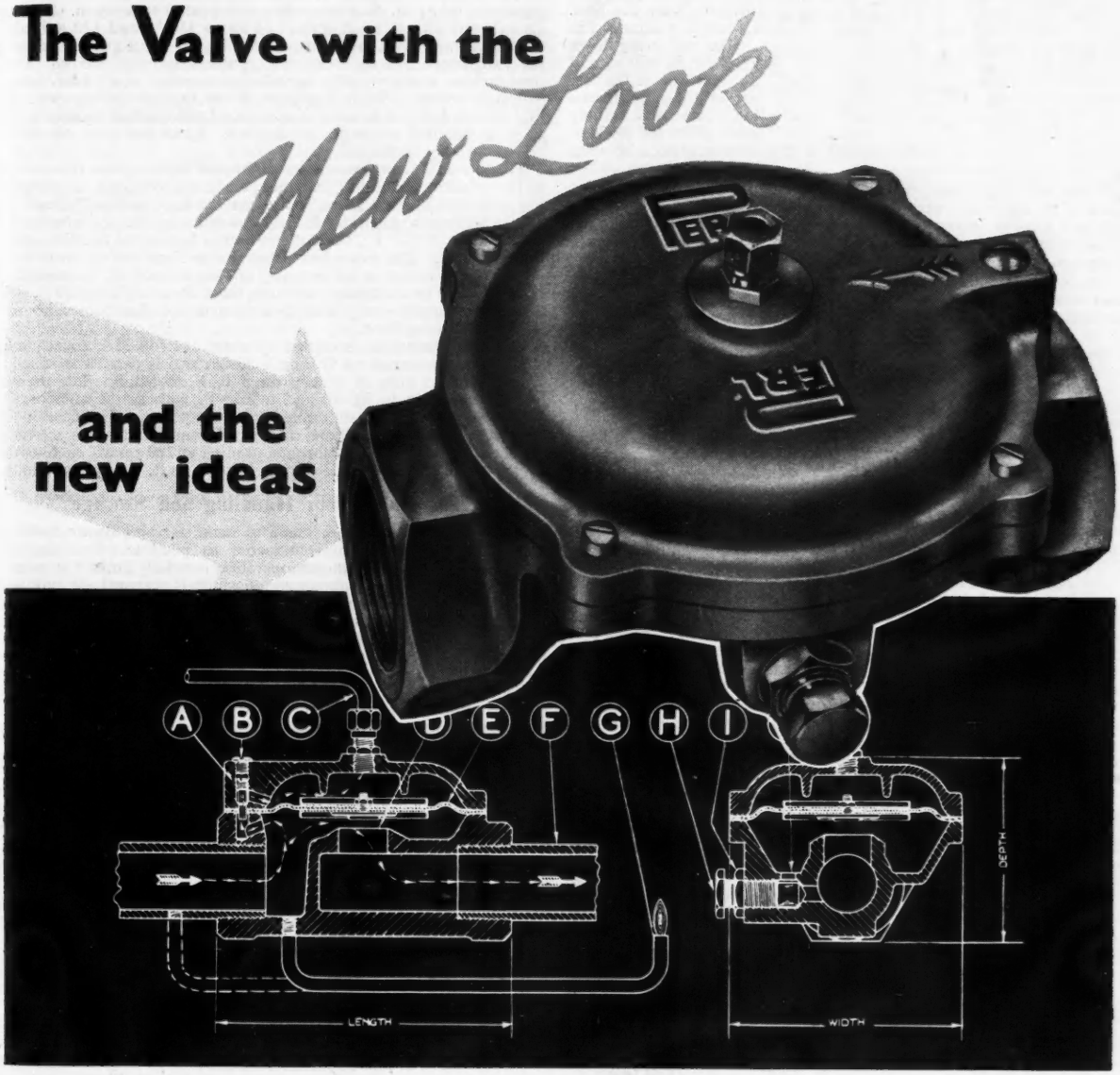

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The sequence of plant adopted to achieve these standards for No. 3 battery have been indicated. The essential difference from the Nos. 1 and 2 battery scheme is that fairly complete cooling is arranged in the primary condensers before the exhausters. This will bring down the bulk of the naphthalene in a position where it can be melted and dissolved in the tar by condenser reversal. By removal of the last traces of tar fog after the exhausters, the rest of the naphthalene can be extracted in a multi-stage oil washer using a very small volume of oil. Elimination of the tar and naphthalene simplifies the work of the final cooler which should achieve a very close approach between gas and water temperatures.

It will still be necessary to protect the ammonia washers from any trace of oil fog which would hinder the formation of a proper water film and thereby reduce the efficiency of extraction. To do this the second electrostat has been included to remove oil fog formed but not deposited in the secondary condenser.

The whole scheme, however, is dependent on a supply of really cold water. This is to be achieved by the use of a two cell forced draught cooler which is capable of reducing the water to within 3° F. to 4° F. of wet bulb temperature. Apart from short, hot, humid periods the wet bulb temperature rarely averages over 59° F. even in summer. In 1947 which is generally regarded as a particularly warm summer, the wet bulb temperatures were as follows: May 54° F., June 58° F., July 62° F., August 62° F., September 57.6° F. Further details of the plant are as follows:

Primary Condensers

The three primary condensers consist of eight pass Whessoe type with 672 2½ in. O.D. vertical tubes, 26 ft. long, giving 11,600 sq. ft. cooling area. When fed with 8,500 gall. of water at 55° F., these units should cool the gas to 60° F. and should give approximately 70° F. rise to the water.

The condensers are provided with two seal pots, each collecting the condensate from half the condenser. Each seal pot is connected to both the strong and the weak liquor tanks, and when the condenser is reversed, these connexions will also require reversing. From our experience of coke oven gas for Durham coal, under our conditions a considerable amount of solid naphthalene condenses separately between 80° F. and 60° F., and it is expected that the condenser surfaces will coat rather rapidly and the direction of flow will require frequent reversal. Since manual operation of 42 in. gas valves is slow and cumbersome small air motors have been fitted to the operating spindles of the Westwood and Wright valves so that frequent reversal would not be an onerous operation.

A point of general interest to be noted at this stage is the problem of corrosion of condenser tubes. With the gradual substitution of water tube for atmospheric condensers at Beckton, tube replacement became very considerable and tubes have been known to become leaky within six months of insertion. Careful records were kept and many types of tubes and operating conditions have been tried. At this time a new technique of keeping the tubes clean was adopted. This consisted of emptying the condenser each week to remove dirt and sludge before they consolidated on the tubes. Later, the inlet and outlet water valves were opened in turn when the condenser was empty to flush out the deposits more thoroughly.

After some time, it was realized that tube replacements on all the condensers treated this way were becoming less and less. In fact, all the tubes under test gave a satisfactory life under these conditions so that this technique has been adopted throughout at Beckton. Apparently our trouble was caused mainly by two forms of corrosion: (1) Corrosion by differential aeration, in which it is important to avoid free air entering with the water and to allow free vent to any evolved due to rise in temperature, and (2) " hidden area " corrosion, *i.e.*, attack under mud deposits which is really a special form of the above type of corrosion. By avoiding these two types of corrosion, the two most violent forms of " local " attack were practically eliminated.

To try to improve on our present conditions, therefore, in this new plant, a sand filter has been inserted in the water circuit through the condensers, to prevent as far as possible any deposition of mud. In addition, it will be noted that the vertical tube type has been chosen as it is felt that both dirt and air bubbles will be less likely to adhere to the tubes. Considerable interest centres in the results of this lay-out, though it is a long term experiment and will require a considerable period before any proof of the advantages can be collected.

Exhausters

The exhausters are electrically driven. The power required, about 80 h.p., is rather low for it to be economically sound to fit a steam turbine with separate condensing plant. Without this auxiliary, consumption of steam is high, whereas with an electric drive the current can be generated at high efficiency in a central plant. Constant speed induction motors are used and the suction controlled by an Askania governor and butterfly valve in the inlet main. This control has been very satisfactory on Nos. 1 and 2 batteries as it can deal with the sudden rush of gas while an oven is being charged, which is beyond the rate of acceleration of a turbo exhauster. Each exhauster has a capacity of 440,000 cu.ft. per hour at 40 in. w.g. differential and is of B.T.H. manufacture, driven through speed increasing gear by an 80 h.p. motor running at 1,475 r.p.m.

The primary detarrer is 8 ft. diameter by 26 ft. high, and contains 106 6½ in. diameter tubes with central tube 8½ in. diameter. Each is fed with rectified current at up to 33 kV. and 120 milliamps (maximum). This is to remove the tar fog left in the gas after passing the exhausters and so avoid any contamination of the oil in the naphthalene washers. The naphthalene washer is a 12-bay rotary Whessoe washer, with independent drives to each six-bay unit. At first this washer will be fed with new gas oil, the spent oil being disposed of in carburetted water gas production. Later the spent oil will be regenerated by distillation.

The secondary condenser is an eight-pass vertical tube type similar to the primaries but with 720 tubes, single seal pot, and no provision for reversal. Some 4,000 gall. of water per hour has been allowed to ensure cooling the gas to 60° F. As this will only raise the temperature of the water 12-15° F., the outlet water is fed to the middle pass of the primaries. The secondary detarrer is a duplicate of the primary detarrer and serves to remove any oil fog formed in the secondary condenser. For ammonia extraction there are two 12-bay 10 ft. 6 in. diameter Whessoe rotary washers arranged to utilize cooled primary liquor or water or both.

The circulated water is cooled by a two cell forced draught cooler in reinforced concrete to G.L.C.C. design and is capable of cooling 23,000 gall. per hour of water from 130° F. to 54° F. when the wet bulb temperature is 50° F. and to 62° F. with a wet bulb of 6°F With one cell in action, the cooled water temperature would be 60-61° F. under the first conditions and 67° F. under the latter. Air is supplied by two 9 ft. diameter fans running at 280 r.p.m., each driven by an 8 h.p. motor and delivering 100,000 cu.ft. of air per minute.

Tar and Liquor Handling and Storage

A special effort has been made to make tar and liquor handling and storage as simple and foolproof as possible. The pumping operations number six and each operation is strictly limited to its own circuit, for which two pumps (one of which is a spare) are supplied.

All tar and liquor from the collecting mains and the hotter half of the primary condensers is returned to the decantation tanks, which act as the primary separators. The excess of liquor made overflows from this to a weak liquor storage tank. All the liquor and traces of tar from the cooler half of the primaries, and all condensates and liquors from plant after the exhausters, flow by gravity to the strong liquor buffer tank. All tar from the decantation tanks flows by gravity to the tar buffer tank. The pumping operations are, therefore, as follows:

(1) 30,000 gall./hour weak liquor from the decantation tanks to the battery (continuous).
(2) Approximately 1,000-1,500 gall./hour of mixed primary condenser tar and weak liquor to the decantation tanks (continuous).
(3) Approximately 6,000 gall./day of tar to the tar storage tank via a tar separator (intermittent).
(4) Approximately 250 gall./hour weak liquor via the liquor cooler to the ammonia washers (continuous).
(5) Approximately 9,000 gall. of strong liquor per day from strong liquor buffer tank to strong liquor storage (intermittent).
(6) 20 gall. oil per hour from rich oil tank via still, &c., back to naphthalene washer.

The only pumping service on water is, of course, the closed circuit which pumps water from the pond beneath the cooling tower through the sand filter and condensers and returns via the cooling tower. Each circuit is completely separated from the others so that no accidents can happen through inadvertent use of inter-connecting valves.

Some trouble was experienced in the tar separators and storage tanks of Nos. 1 and 2 batteries with the gradual accumulation in the base of a solid matter apparently of a pitchy nature. After two years' work and passing some 2 million gall. of tar, this deposit clogged the steam heating coils and prevented free separation of liquor necessitating cleaning. In the new plant duplicate overhead separators have been arranged with steam jacketed conical bases. It is intended to draw off small quantities at frequent intervals before these solids have agglomerated into a solid cake. The absence of steam coils should facilitate this operation.

No. 4 Battery Ancillary Plant

In general principle this follows the same design except for the primary condensers. These consist of three square washer coolers* each packed with grids and fed with liquor cooled in C.I. rack coolers. The plant avoids the use of water tube condensers and is generally of simple and robust construction, but it is not possible to separate the liquor into strong and weak portions. On the other hand the complications necessary for frequent condenser reversals are avoided. Careful comparison will be made between this plant and No. 3 and the results should have considerable interest.

The problem in the modernization of ancillary plant of Nos. 1 and 2 batteries during resetting is rather more difficult for two reasons.

1. This is a single 16 million cu.ft. per day unit as regards gas treatment but the two batteries will be reset in turn so that it may be necessary to alter the plant and still handle half the gas.
2. It is desired to utilize the maximum amount of the existing plant.

Using the same principles as for No. 3 battery, the space occupied

* L. Silver. Paper to the Institution of Chemical Engineers, Mar. 4, 1947.

by the old P. and A. tar extractors will be used for four additional primary condensers thus increasing the area to a figure comparable with No. 3 battery. Each of these will make a pair with one existing condenser which can be reversed as a unit. The existing steam driven exhausters will then pass the gas to a new static naphthalene washer using some form of creosote wash oil, since no primary detarrers are to be used. Oil regeneration as outlined previously will be employed. The existing final scrubber coolers will be employed for final cooling, followed by electrostatic fog removal and the existing ammonia washers. Tar and liquor circulations will follow the same lines as No. 3 battery and a three-cell forced draught water cooler will be substituted for the existing natural draught cooler.

The retort house gas streams are of a size comparable with No. 3 battery and the design being considered differs only in that the existing atmospheric condensers will be retained.

From the time and trouble taken with the design of these units it will be seen that an attempt is being made to create a standard layout which can be used generally with modifications to suit special conditions. Each unit in these plants consists of a well proved model by a well-known plant manufacturer. The arrangement is unusual but is such that all solids and liquids are adequately dealt with while running and reliable operation is anticipated together with the high standards set out in the early part of these records.

Needless to say, many besides the authors of this paper have co-operated in the production of these designs and to them all thanks are due. It is also wished to thank the Directors of the Gas Light and Coke Company for permission to present this paper.

Appendix A.—The Vapour Pressure of Naphthalene

The various published data for the vapour pressure of naphthalene have been reviewed. It is recommended that the data from International Critical Tables (1928) be adopted and the following Table of Vapour Pressures has been calculated therefrom. Experimental determinations by one of the authors (L.A.R.) confirmed that these data are applicable to wet or dry conditions. The last column of this table contains values expressed in the gas-works units normally used in this country.

VAPOUR PRESSURE OF NAPHTHALENE (FROM DATA GIVEN IN INTERNATIONAL CRITICAL TABLES, 1928)

Temperature (t)		Vapour pressure	Naphthalene* (N)
°C.	°F.	mm. of mercury	grains per 100 cu.ft.
0	32	0.00623	1.91
5	41	0.0110	3.39
10	50	0.0189	5.85
15	59	0.0320	9.93
20	68	0.0533	16.6
25	77	0.0871	27.4
30	86	0.141	44.8
35	95	0.222	71.5
40	104	0.346	114
45	113	0.533	179
50	122	0.809	280
55	131	1.21	437
60	140	1.80	681

* N = grains of naphthalene contained in a volume of gas (at temperature t° under a total pressure of 30 in. mercury and saturated with water vapour and naphthalene vapour) which measures 100 cu.ft. at 60° F. and 30 in. saturated with water vapour.

The following points may be of some assistance when seeking to elucidate the apparently anomalous behaviour of naphthalene:

(1) Naphthalene will be deposited from gas saturated with it by (*a*) lowering of temperature or (*b*) reduction in volume incurred by increase of total pressure or by removal of one or more of its constituents by solution, adsorption, or condensation. When a gas, saturated with both naphthalene and water (or a solvent such as condensable oils) is cooled at constant pressure, naphthalene is deposited due to two, or even three, additive causes—(*a*) thermal contraction; (*b*) reduction in gas volume incurred by decrease in the vapour pressure of water (or solvent); and (*c*) solubility in the solvent when the latter is present as liquid.

(2) A dry or partially dry gas, saturated with naphthalene, can produce a cloud of minute crystals on cooling, and these, being of a very light nature, can be carried along by the gas flow and deposited at remote points. Erroneous high results, dependent on the analytical procedure adopted, may be obtained if these crystals find their way into apparatus for the determination of the naphthalene content of gas.

When the gas is also saturated with water these particles serve as nuclei for aqueous condensation, when their weight is greatly increased and they tend to be readily deposited.

(3) Naphthelene will not be deposited from gas which has been rendered unsaturated by increase of temperature, decrease of total pressure or by removal (by adsorption or solution) of some of the naphthalene, until the temperature and/or pressure conditions again render it saturated.

(4) It is possible, in special circumstances such as when dry gas, saturated with naphthalene, is suddenly brought into contact with water by passage through a jet, for the intense local cooling, which occurs during the rapid rehydration of the gas, to cause small cumulative deposits of naphthalene to form close to the point of rehydration, usually out of contact with the water.

NAPHTHALENE CONTENTS BEFORE AND AFTER CONDENSATION OF CRUDE COAL GAS FROM DURHAM COAL CARBONIZED IN DIFFERENT TYPES OF PLANT

(Results expressed as grains per 100 cu.ft. of purified gas measured saturated with water vapour and at a temperature of 60° F. and a pressure of 30 in. of mercury)

Type of plant and sampling point	Gas temperature F.	Naphthalene content of gas Grains per 100 cu.ft.	Remarks
Coke ovens—			
Before gas cooling	169	258	Some solid naphthalene entrained
After gas cooling	61	17 (fully saturated)	in cooled gas
Horizontal retorts—			
Before gas cooling	143	241	Some solid naphthalene entrained
After gas cooling	60	16 (fully saturated)	in cooled gas
Intermittent vertical Retorts—			
Before gas cooling	169	133	
After gas cooling	50	3.7 (not saturated)	Naphthalene content of gas saturated at 50° F. =5.8 grains per 100 cu.ft.
Continuous vertical retorts (slightly steamed)—			
Before gas cooling	150	105	
After gas cooling	62	2.8 (not saturated)	Naphthalene content of gas saturated at 62° F. =11.2 grains per 100 cu.ft.

The incidence of naphthalene deposits in condensers is determined not only by the naphthalene content of the crude gas but is much influenced by the presence of tar oils of similar boiling point. The following data for the relative proportions of middle oils to naphthalene in crude tars from various sources are, therefore, of particular interest. These results were obtained by the analytical procedure included in Appendix B.

Source of tar Durham coal carbonized in	Tar oil distillate 170-250° C. Per cent. by weight of dry crude tar	Naphthalene	Ratio of tar oil to naphthalene
Coke ovens ...	12.9	8.8	1.5
Horizontal retorts ...	20.0	9.6	2.1
Intermittent vertical chambers... ...	16.9	7.1	2.4
Continuous vertical retorts (slightly steamed)	19.5	4.6	4.5

Appendix B.—The Determination of Naphthalene in Crude Coal and Similar Products

In either edition of "Standard Methods for Testing Tar and its Products"* no method appears for the determination of the total naphthalene in coal tar, although one has been included for determining the naphthalene, deposited and recovered in certain standardized conditions, from a specified fraction of tar distillate, from which tar acids have been removed. The proportion of unrecovered naphthalene excluded from the analytical result is affected by the proportion of oils (excluding tar acids) distilling over and containing the naphthalene. This amount of oils varies from tar to tar and the unrecovered proportion of the naphthalene remains dissolved therein. This method of analysis, no doubt, has been adequate from the viewpoint of the tar distiller, but it does not indicate the actual amount of naphthalene in the tar or even its presence in those tars containing a low proportion of naphthalene, such as a normal vertical retort tar.

A number of methods has been published during the last 50 years or so for the determination of naphthalene in tars, oils, and allied products, but none seems to have been universally applicable or acceptable.

The method described below employs precipitation procedure using a weighed portion of a specified fraction of distillate, *viz.*, 170-250° C. in the case of tar (170-285° C. in the case of wash-oils of petroleum origin). This fraction was chosen so that, whilst containing all the naphthalene, picrate-forming compounds of high boiling-point, such as anthracene, phenanthrene, and acenaphthene, are eliminated also low-boiling ones, such as pyridine. Small amounts of picrate-forming compounds, mono- and dimenthylnaphthalenes, quinelines and thionaphthene, will appear in this fraction and will be included in the result, expressed as "naphthalene." These amounts are normally small and tend to offset a small distillation loss of naphthalene. An allowance for picrate-forming unsaturated compounds, which are, in this case, assumed to possess one double-bond only, is made by determination of an iodine value on an aliquot portion of the precipitated picrates. This method of correction was originally introduced, in the early 1920's, by A. Edwards† in a standard method (unpublished) for naphthalene in coal gas and which had advantages over other methods.

The basis of the method to be described was suggested by one of us (S.P.) some years ago, when a provisional means of obtaining naphthalene balances on coal gas streams was required. Recently this procedure has been closely studied and adapted to all high-temperature tars, to carburetted water gas tar, and to wash-oils of petroleum origin. It is not claimed to be, *per se*, an absolute method for naphthalene for the reasons already given, in that it is possible for small amounts

* Published by the Standardization of Tar Products Tests Committee.
† At that time Station Chemist at Beckton Gas-works.

of similar compounds to be included in the result but the accuracy is usually well within ±1% of the weight of tar and is adequate for ordinary purposes.

If the facilities exist and the necessary time can be devoted to it, a high-degree fractionation (say, 25 theoretical plates) of the tar will enable a much more accurate determination of the true naphthalene-content to be made by the use of a portion of the fraction 200-230° C. for precipitation of the picrates. The sole normal contaminant, included in the result, is then a small proportion of thionaphthene. Such a high-degree fractionation was used as a final check on the present method.

The advantages of the "General Method" are that it is applicable to a wide range of tars and is less tedious and prolonged than one of the more usual streaming methods which tend to give low results unless very careful precautions are taken to ensure that all the naphthalene is both vaporized from the tar or oil and converted to picrate. A complete determination can be made within 24 hours and no special apparatus is required.

On the other hand, it cannot be applied when only a few grammes of the material are available, as a quantity is required for the prescribed distillation. It has not been found possible to adapt it to the determination of naphthalene in light oils because of the high solubility of naphthalene picrate in these oils.

General Method

This procedure applies to all high-temperature tars except vertical retort tar and to wash-oils of petroleum origin.

Distillation. 200-300 gms. of the wet tar are weighed into a 500 ml. round-bottom flask fitted with a short, 4 in., lightly-packed column to serve as a spray-trap. The tar is then dehydrated by distillation, the distillate being cooled in a Liebig water-cooled condenser. Careful heating with a constantly-moving flame is usually necessary during this operation, to avoid priming. The distillation is continued until the temperature at the top of the column is 170° C. The aqueous portion of the distillate is separated and measured, the oily portion being returned to the flask. The distillation proper is now carried out and the fraction 170-250° C. is collected in a tared receiver and weighed. This second distillation usually can be carried out using an air-cooled condenser throughout. It is essential for the fraction 170-250° C., to avoid blockage.

Precipitation and analysis of picrates. The precipitation should not be delayed, at least not longer than a day or two, owing to a deterioration of the fraction, leading to erroneous results. It is preferable to carry out duplicate precipitations and take the mean of the two results.

Sufficient of the fraction 170-250° C. (molten, if solid is present at room temperature) is weighed out in a 25 ml. stoppered separating-funnel to contain 0.07 to 0.09 gm. of naphthalene. This amount may be modified if a precipitate, difficult to filter, is formed. 15 ml. of acetone (redistilled) are then added to the funnel to dissolve the contents and the solution dripped slowly into 300 ml. of vigorously-stirred picric acid of 0.47 N/10 strength. The mixture is allowed to stand overnight, covered, at 60-65° F. Below 60° F. there is a risk of separation of picric acid crystals. The precipitate is separated by vacuum filtration in a 25 ml., or larger, Gooch crucible fitted with a filter-paper, well drained, then washed with a few milliletres of N/100 aqueous picric acid and again well drained. It is then dissolved in a total of 20-40 ml. of chloroform (A.R.) and this solution is divided, by suitable means, into two equal volumes, A and B.

Portion A is shaken with a little distilled water and titrated with N/10 NaOH, using lacmoid indicator. Portion B is placed in a glass-stoppered bottle of about 150 ml. capacity and reacted with an appropriate measured volume of Wij's iodine solution at room temperature. The minimum quantity of Wij's solution is such that not more than one-fifth of the reactive halogen is consumed. A blank determination is carried out alongside, using the same volumes of chloroform and Wij's solution as used for portion B. After a three minute reaction period, the contents of the bottles are each diluted with 100 ml. distilled water, potassium iodide added and the residual iodine titrated with N/10 sodium thiosulphate, using starch indicator.

In calculating the result, the assumption is made that the interfering picrates of unsaturated compounds possess a single double-bond and react with two atoms of iodine per molecule.

CALCULATION OF RESULT:

If W = wt. of wet tar
v = vol. of water collected
F = wt. of fraction 170-250° C. (after treatment with 80% H_2SO_4 in certain cases)
f = wt. of fraction taken for precipitation of picrates
x = ml. of N/10 NaOH required
y = ml. of N/10 $Na_2S_2O_3$ required for blank determination on Wij's solution
z = ml. of N/10 $Na_2S_2O_3$ required for excess iodine in reaction bottle

then % (by wt.) naphthalene in fraction 170-250° C.

$$= 1.28F \left\{ \frac{2x - (y - z)}{f} \right\}$$

or % (by wt.) naphthalene in dry tar $= 1.28F \left\{ \frac{x - -y - z)}{2f\,(W - v)} \right\}$

Modifications of Method for Use with Special Products

Vertical retort tars. In order to attain the necessary accuracy with vertical retort tars, it is desirable to remove the majority of the unsaturated compounds, including all highly-saturated ones, by treating the fraction 170-250° C. with 80% H_2SO_4 and redistilling, before proceeding with the precipitation. To carry out this acid-treatment, the fraction, which normally contains no solid at room temperature, is shaken with twice its volume of 80% H_2SO_4 in a separating-funnel for 15 minutes at room temperature. After standing for at least one hour, the acid layer is run off and the oil layer washed several times with distilled water to remove residual acid. The oil is then dried in contact with a little fused calcium chloride and distilled to 250° C. into a weighed receiver. A weighed small portion of the distillate is used for the precipitation of the picrates, which are separated and analysed, as described under "General Method."

Petroleum Wash-Oils, used for benzole or naphthalene removal.—With these wash-oils, the general distillation procedure is followed, except that the fraction 170-285° C. is collected instead of the fraction 170-250° C. and the volume distilling below 170° C. is noted. The fraction 170-285° C. is then treated with 80% H_2SO_4 as in the case of vertical retort tars. If, however, it contains solid before acid-treatment, or solid tends to be deposited during the treatment, then just sufficient benzene is added to keep the solid in solution, the benzene being removed and discarded during the subsequent redistillation. In either case, the remaining distillate to 285° C. is then weighed and used as the source of material for the precipitation. The procedure is then as prescribed under "General Method." After calculation, using the formula given above, the result is then multiplied by a factor, which normally lies between 1.1 and 1.3, in order to maintain a comparable accuracy. The determination of this factor, which is necessary to compensate for distillation and certain analytical losses, does not usually require repetition for each of a series of similar samples. It is determined as follows:

About 250 ml. of an artificial wash-oil are made up of the following components, which are weighed out:—

Benzole.—Proportion corresponding to the fraction of the original wash-oil which distils below 170° C.

Naphthalene (pure flake).—Proportion as found by the above analysis, plus 20%, and weighed out accurately to 0.1 gm.

Remainder.—Fresh wash-oil, usually gas oil or "absorption" oil (assumed to be naphthalene-free).

A weighed amount of this mixture is distilled in the same apparatus and in the same manner as the original wash-oil, followed by similar acid-treatment and precipitation. As the true amount of naphthalene in it is known, the proportion of naphthalene, accounted for by analysis, can be ascertained. The reciprocal of this proportional figure is the factor mentioned above.

Thanks are due to Mr. W. V. Shannan and Mr. W. E. Golding for the high degree fractionation of the tar-oils used as a check of the method.

A WATER HEATER AWARD

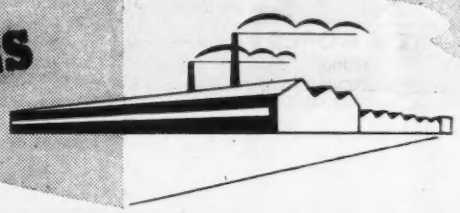
A pleasant ceremony took place at a Directors' luncheon on May 31, at Cheltenham, after the usual Board meetings of the Cheltenham, Gloucester, Stroud, and Newport Gas Companies had been held, when a presentation was made to two employees of the Cheltenham and District Gas Company.

Severn Valley Gas Corporation, Ltd., the Holding Company of the above-mentioned gas undertakings, recently offered a prize of £100 to the individual, employed by a constituent Company of the Corporation, who designed a suitable gas operated immersion water heater. Mr. G. M. Gill, Chairman of the Cheltenham and District Gas Company, who gave details of the competition, said that six individuals had entered, and that the result showed that the winners, Mr. F. H. Watts and Mr. R. Pockett, assistants to Mr. A. G. Holtam, Distribution Engineer to the Cheltenham and District Gas Company, had distinct merit in thinking out a piece of apparatus which gave the Directors of the Holding Company every satisfaction. The judge of the competition was Mr. Dean Chandler, previously associated with the South Metropolitan Gas Company.

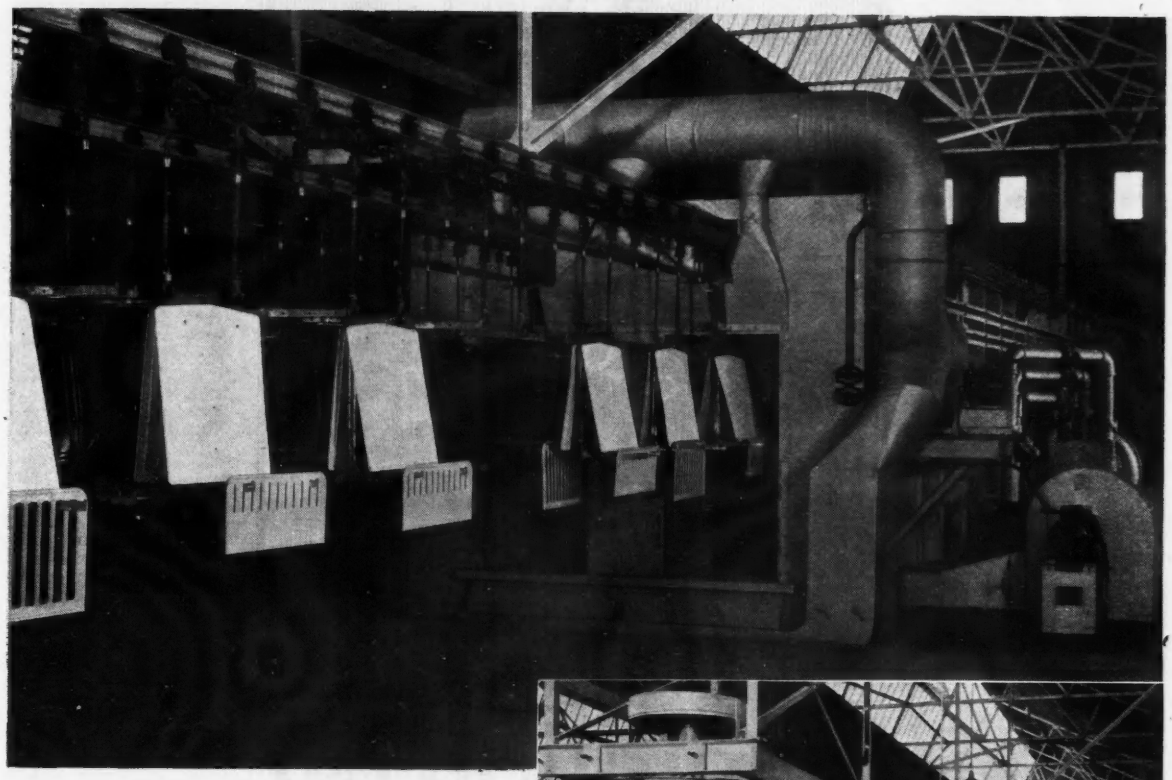
Sir Leslie Boyce, Chairman of the Severn Valley Gas Corporation, Ltd., in handing the cheque of £100 to the winners, said that they had exercised inventive genius in practical channels, and that with such initiative and enterprise in the undertakings under the Corporation's control, it seemed hardly necessary for the Government to "step in." He also mentioned that Mr. Watts, in addition to his present success had also obtained the B.G.C. (Midland District Salesmen's Circle) prize for the best paper during the past season.

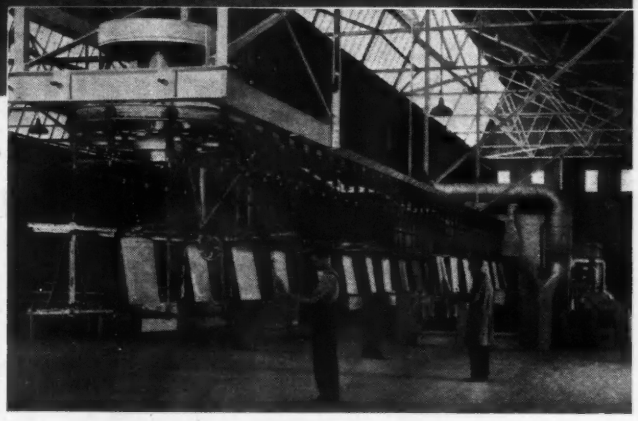
Mr. F. H. Watts thanked the Directors for the cheque, and said that the efficiency of the immersion water heater was reasonably high, and that the appliance, which had been patented, had overcome the previous draw-back of "liming up."

BEHIND THE SCENES



IN THE MANUFACTURE OF MODERN GAS APPLIANCES





Enamelling . . . final stage

After thoroughly drying (in low-temperature ovens) the enamel sprayed on them, the various cooker components are ready for the final stage in the enamelling process. It is an operation during which the different parts are subjected to a glowing heat with the result that the carefully applied enamel coating is converted by fusion until it has a glass-like surface which will be at once hard-wearing and easy to clean. Illustrated here is a continuous gas-fired enamelling "muffle" which was installed in one of the MAIN factories before the war. The first of its type in Europe, it has an overall length of 120 feet and uses approximately 8,000 cubic feet of gas per hour. Under carefully controlled conditions, a continuous flow of enamelled parts passes on an overhead conveyor through the enamelling furnace, where the maximum temperature of 900° may be graded down to as low as 780°, according to whether the parts are sheet steel pressings or castings.

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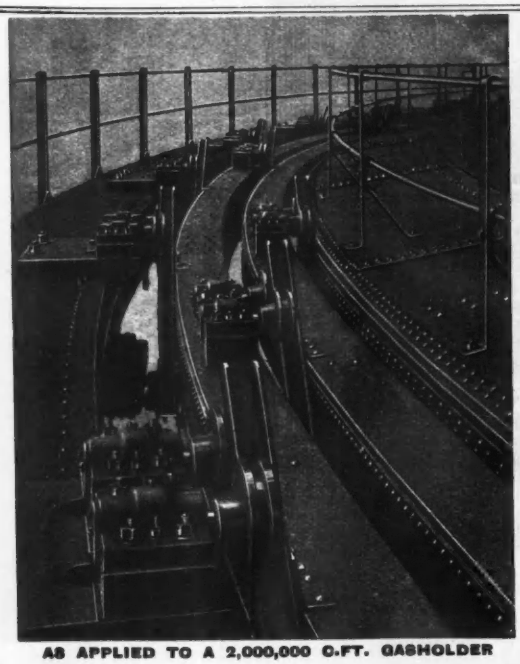

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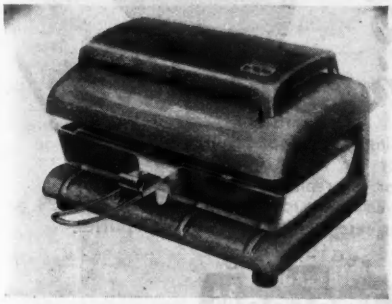
A New Unit Griller

After close inspection of a new unit griller marketed by De La Rue Gas Development, Ltd., we feel sure that it will meet with wide acceptance by the gas industry and by the public. Operating on the neat gas principle this new appliance appeals to us from the points of view both of appearance and performance; it will undoubtedly appeal to the housewife as an easy-to-clean unit, speedy in operation, and having a wide grill area over which the heat is evenly distributed. The appearance of the De La Rue griller can be envisaged from the accompanying photograph. The effective area of the grill is 11 in. by 7 in. and the heat input is 15,000 B.Th.U. hour (30 cu.ft. with gas at 500 B.Th.U.); the overall dimensions are 8¼ in. high, 12½ in. wide, 9¾ in.



deep. The grill fret is of heat-resisting steel and is fitted with expansion clips to prevent distortion, while the griller, robust throughout, can be easily dismantled into three component parts for cleaning. A feature which will interest the housewife is that the pan is fitted with a heat resisting handle of stainless steel which is detachable by thumb pressure. This feature allows the pan (which is die-cast aluminium) to be used as a serving or a cooking dish. Impressive is the cooking capacity of the grill. If only we had the ingredients of a mixed grill for, shall we say, a family unit of four. Yet, if we have no cake, at least we have bread, and four slices per time on the grid of this griller—four slices evenly toasted in quick time.

GAS UNDERTAKINGS' RESULTS

Bideford Gas and Coke Company.—Gas sales in the year ended Mar. 31 amounted to 245,980,500 cu.ft. and yielded £63,168 towards a total revenue of £85,824. The balance carried to profit and loss account was £5,825. Final dividends making 5% p.a. on the Preference shares, 13½% on the Original shares, and 10½% on the Additional shares leave a balance of £4,211 to be carried forward, compared with £2,775 brought in.

Peterborough Gas Company.—Presiding at the annual meeting on May 31, Mr. A. J. Paten, Chairman of Directors, said it seemed highly improbable that he would be privileged to preside over another annual meeting. He had been a member of the Board since 1904 and Chairman since 1927. Practically the whole of the works had been reconstructed or was in process of being reconstructed, and on completion of the work in hand and contemplated the works would be one of the most up-to-date in the country. The price of gas which was increased on Nov. 1, to consumers other than certain large industrial consumers, remained one of the lowest in the country for an undertaking manufacturing its entire output. Progress was being maintained on the new holder of 2 million cu.ft. capacity and the contractors anticipated completion by the end of 1948. A new coal gas condenser of 3½ million cu.ft. a day capacity was nearing completion in the manufacturers' works and would be delivered shortly. Dividend was declared at the rate of 5% on the Preference "A" shares, 7½% on the Consolidated Ordinary stock, and 3¾% on the Redeemable Preference stock, 1967. Sir Arthur Craig, who was re-elected a Director, said the Company became a statutory company in 1868, before which it had been conducted by Mr. James Sawley for at least 25 years. So it had a history of over a century. Its original share capital was £30,000 and its limit of borrowing was £7,500. To-day the share and loan capital was a little over £437,000. In 1868 revenue from the sale of gas was £5,262. For the year just ended it was £123,614. There had been only four Chairman in that time (John Miller, 1868-72; William Harris, 1873-1909; D. H. Redhead, 1909-27; and A. J. Paten, 1927 to the present time) and six Engineers—a wonderful record. The present Engineer and Manager, Mr. Rhead, had been with the Company since 1946, but, due to his capabilities, it was no idle boast to say that the works ranked among the most efficient and up-to-date in the country.

Primitiva Holdings, Ltd.—The accounting period has been changed, and the accounts for the eight months ended Dec. 31, 1947, have now been issued. In a statement circulated to shareholders Mr. W. M. Codrington, the Chairman, says that the Primitiva Gas Company's accounts for the year ended Dec. 31 disclose a loss of £20,959 compared with a loss of £52,918 for the previous year. The reduction is almost wholly accounted for by the fact that the profit and loss account does not now have to bear any charge for debenture sinking fund or interest. The loss for 1947 is arrived at after taking credit for net investment income amounting to £16,716. In the Gas Company's balance sheet there is only a trifling change under the heading of fixed assets. Floating assets have, however, decreased by £78,000. This is mainly accounted for by a reduction in creditors of some £40,000, the repayment of £20,000 of debentures, and the loss already mentioned. The carry forward is reduced from £70,603 to £49,644, and the Primitiva Gas Company has not, therefore, been able to declare any dividend. Although the last of the Province of Buenos Aires Gas Company's three municipal contracts expired in June, 1947, the Company continues to operate. The Province of Buenos Aires has granted to the Argentine State Gas Department a monopoly to supply gas to consumers in all the districts served by the Company; but it is not yet known how this obligation is to be implemented. In November, 1947, however, the State Gas Department conducted an intensive canvass of the 530 consumers in the Adrogue district, as the result of which 490 of these consumers decided to change over to bottled gas, supplied by them. The total number of consumers connected to the mains was thereby reduced to 7,950. For 1947 the Provincial Company showed a profit of some £2,000. The reduction from £4,800 in 1946 was due to the increased cost of bulk gas supplies, as the change over to bottled gas in Adrogue only became effective in the last two months of the year. Some reserves no longer required have been brought in, 6% interest has been paid on the Company's debenture stock in respect of the year 1947, and the Holdings Company will include its proportion of this interest amounting to £4,728 in its 1948 accounts. The Directors are willing to negotiate with the authorities for the sale of the Provincial Company's assets at a reasonable price, and some preliminary discussions have already taken place.

At the last annual meeting the Chairman gave a full account of the claims of the Gas Company in respect of the expropriation of its assets by the Argentine Government, and other matters. The two main lawsuits, which are distinct from one another, deal respectively with the amount to be paid for expropriated assets, and with the municipal claim for alleged excess profits. There have been no major developments to record in connexion with the expropriation suit since last year. The preparation of the detailed valuation of assets continues, but progress is necessarily slow in view of the amount of work involved. Three experts are engaged on this task. One represents the Company, one represents the expropriating authority, the State Gas Department, while the third is appointed by the Supreme Court of Argentina. Under a recent ruling of the Court, all three experts must submit their findings to the Court at one and the same time. At the invitation of the National Treasury Solicitor, a meeting was held on Dec. 4 at which, in addition to the solicitor in question, the three experts and a representative of the Company were present. The meeting was called to discuss the valuation in all its aspects. All present showed a genuine desire to co-operate in speeding up the completion of the valuation. On Nov. 21 the Civil Court of Appeal unanimously upheld the decision of the Lower (Civil) Court to the effect that the embargo placed by the Municipality on the funds of the Company as security for their claim in respect of alleged "excess" profits was invalid. In a notice published in the British Press on Nov. 25 announcing this verdict, the opportunity was taken to emphasize that this embargo case had no connexion with the main expropriation proceedings, and that the decision dealt with the legitimacy of the embargo, since the actual claim for alleged excess profits had not yet been tried by the Courts. The Municipality, on Dec. 2, applied for leave to submit an extraordinary appeal in connexion with the embargo to the Supreme Court. The lower court refused the Municipality's application for leave to appeal, but Argentine jurisprudence may allow this issue to go forward to the Supreme Court for final decision.

GAS STOCKS AND SHARES

British Funds were aided by the news of the Palestine truce agreement and the better political news from South Africa, and although prices were slightly easier in the middle of the week they rallied again to close at the best of the week. In the industrial market there was general dulness due to consideration of the effects of deflation on various sections. A new warning by the Chancellor of the Exchequer that imports may need to be cut still further to reduce the trade gap led to a little additional selling of industrial shares, and the average prices at the end of the week were lower than they had been since the end of March.

The proposed 25% reduction in Marshall aid contributed largely on Friday to the general uncertainties in the industrial outlook and resulted in a long list of falls in prices. The *Financial Times* industrial Ordinary share index dropped 1.2 points from Thursday's figure to 116.8, making a total fall of 3.7 points on the week. On Jan. 17 last year the index reached 140.6, and on Sept. 3 it fell to 104.2.

Conditions in the gas stock market continued steady, with the week's dealings at practically the same level as for the previous week—the total being 373 against 371. Prices remained practically unchanged.

The week's variations were as follows:

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Associated Gas & Water Undertakings, Ord. ...	22/- — 23/-	-	3d.
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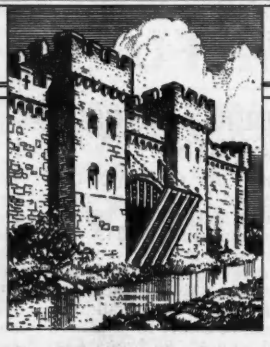

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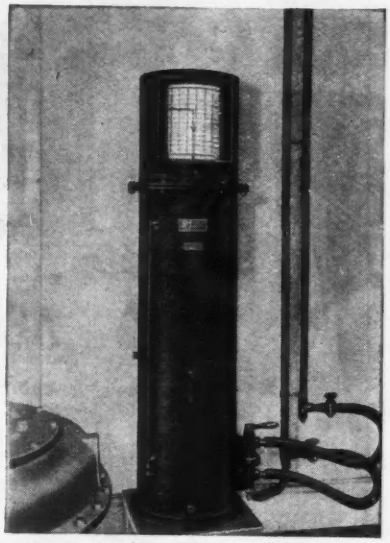
Vacuum Indicators, Dial Type
Pressure and Vacuum Indicators, Dial Type
Inclined Gauges
Full Scale Gauges
Flow Indicators for Liquids
V-Notch Liquid Flow Recorders



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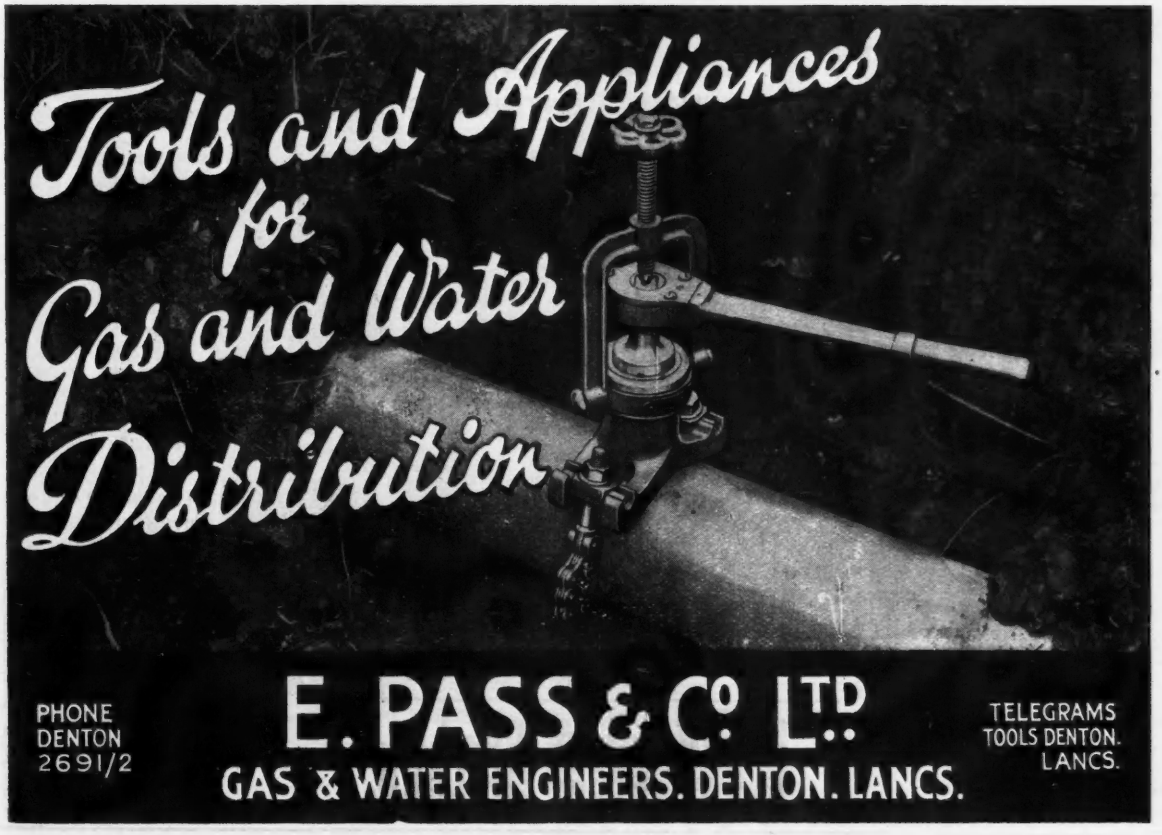

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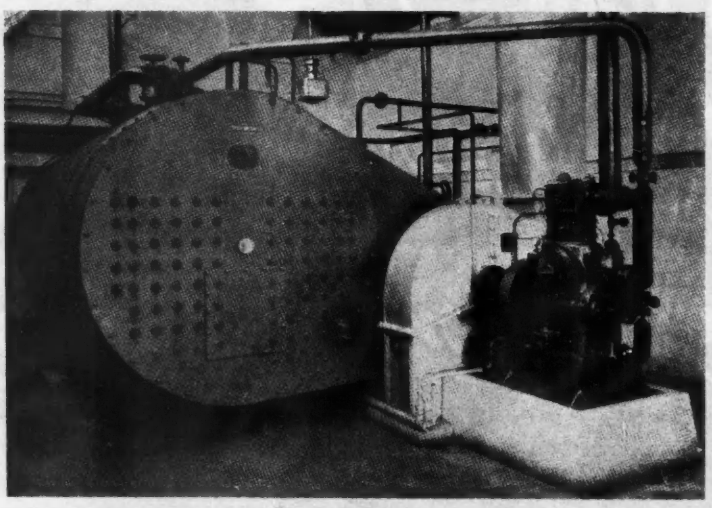

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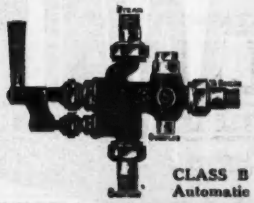

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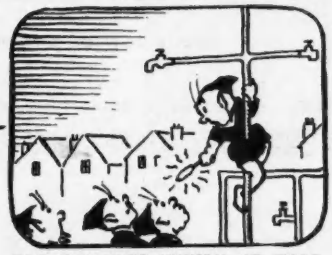

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FOR SALE. 10 ton POT STILL, complete with all fittings, in good condition. Apply A. KING & SONS, 110 Ber Street, Norwich, Norfolk.

FOR SALE. 1,500 gall. cast iron SECTIONAL TANK, in good condition. Delivery without dismantling if required. Apply A KING & SONS, 110, Ber Street, Norwich, Norfolk.

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FOR SALE. One 10 in. Braddocks counter-balance STATION GOVERNOR, type 190, in good condition (new in 1924), complete with two double flanged 10 in. diameter connexions 12 in. long for fixing to inlet and outlet flanges of same.
Offers to CORK GAS CONSUMERS' COMPANY, Gas-works, Cork, to be received not later than July 1 next.

WANTED. One or more secondhand cast iron PURIFIER BOXES, about 20 ft. square, with or without covers, preferably dry lute, but wet lute considered if capable of conversion. Capable of being satisfactorily dismantled and re-erected. Reply, giving particulars, to the ENGINEER AND MANAGER, Gas-works, Ashford, Kent.

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Enquiries to WORKS MANAGER, Gas-works, Cheltenham.

BOROUGH OF BACUP

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THE Council have available for disposal 40 old GAS STREET LANTERNS (cage pattern, size 12½ in. by 8 in. by 14 in.) and six Atlas GAS CONTROLLA CLOCKS (unused), and invite offers for the purchase of same. Inspection may be arranged upon application to the Street Lighting Superintendent, Irwell Terrace Depot, Bacup. Offers should be delivered to the undersigned not later than Monday, July 12, 1948.

C. G. EVERATT,
Town Clerk.

Municipal Offices,
Bacup.
June 3, 1948.

CONTRACTS OPEN

NEWBURY CORPORATION GAS UNDERTAKING

TENDERS are invited for the supply, delivery, erection and putting to work of a Roots type EXHAUSTER of 80,000 cu.ft. per hour capacity.

Copies of the specification, conditions of contract and tender form may be obtained from the Engineer and Manager, Gas-works, Kings Road, Newbury, Berks.

The Corporation do not bind themselves to accept the lowest or any tender. Tenders, in a plain sealed envelope endorsed "Exhauster," must be delivered to the undersigned not later than 10 a.m., Saturday, July 10, 1948.

S. WIDDICOMBE,
Town Clerk.

Municipal Buildings,
Newbury. Berks.

CITY OF COVENTRY GAS UNDERTAKING

SIX MILLION CU.FT. CAPACITY SPIRAL GUIDED GASHOLDER.

THE Gas Committee invites tenders for the supply, delivery and erection, including foundations, at Foleshill Gas-works, Coventry, of a SPIRAL GUIDED GASHOLDER, 6 million cu.ft. capacity.

Specifications, general conditions, drawings and other relevant matter can be obtained from the undersigned. The tender is to be submitted in the envelope provided, endorsed "Spiral Guided Gasholder," addressed to the Chairman of the Gas Committee, Gas Offices, Gas Street, Coventry, and to be delivered at these offices not later than 12 noon on July 8, 1948. The Council do not bind themselves to accept the lowest or any tender.

J. E. WAKEFORD, M.B.E.,
Engineer and Manager.

Gas Offices,
Gas Street,
Coventry.

SPENBOROUGH URBAN DISTRICT COUNCIL

(GAS DEPARTMENT.)

NEW GAS EXHAUSTER SET.

TENDERS are invited for the supply and erection at the Cleckheaton Gas-works of a steam-driven Roots or Connersville type EXHAUSTER SET, capacity 175,000 cu.ft. per hour, HYDRAULIC GOVERNOR, &c., together with an AIR-BLOWER, for purification purposes, of similar type to that of the exhauster.

The specification can be obtained from the Engineer, Mr. Arthur L. Jennings, M.Inst.Gas E., Gas-works, Cleckheaton.

Tenders, in envelopes sealed and endorsed "Gas Exhauster" and bearing no name or mark to indicate the senders, must be delivered to the undersigned not later than Saturday, July 3, 1948.

D COUPE,
Clerk of the Council.

Town Hall,
Cleckheaton.
May 31, 1948.

BOROUGH OF CHESTERFIELD

(GAS DEPARTMENT.)

TENDERS are invited for the RENEWAL of existing CARBONIZING PLANT, comprising rebuilding of retort bench, chimney and six beds of 10 horizontal retorts, together with new bench bracing, foul mains, bench mountings of the Congdon system, and liquor circulating system. Drawings, specification and conditions of contract on application to the Gas Engineer and Manager.

Tenders, in a plain sealed envelope endorsed "Retort Bench Renewal," to reach the undersigned not later than August 16, 1948.

The Corporation do not bind themselves to accept the lowest or any tender.

RICHARD CLEGG,
Town Clerk.

Town Hall,
Chesterfield.
June, 1948.

(*Classified advertisements continued on Supplement* 6)

CONTRACTS OPEN (ctd.)

TENDERS are invited for 72 PURIFIER GR DS approximately 4 ft. 11⅜ in. by 2 ft. 5½ in. by 1¾ in., 25 laths a grid exclusive of frame. Constructed of taper deal bars, strong oak frames, planed on all surfaces.

The Grids to be suitably bolted together and have generally strong structure.

Quotations covering the cost of delivery to the Gas-works, Wombwell, and stating the period of delivery should be sent to reach the undersigned on or before Saturday, July 3, 1948.

F. POTTER,
Clerk of the Council.

Town Hall,
Wombwell.

NEW HUNSTANTON URBAN DISTRICT COUNCIL

TENDERS are invited for the supply, delivery of materials and re-setting of one bed of seven HORIZONTAL RETORTS.

Further particulars can be obtained from the undersigned at the Council Offices, Hunstanton, Norfolk.

Tenders, in plain sealed envelopes endorsed "Retort Renewals," to be addressed to the Clerk of the Council, not later than first post on July 2, 1948.

The Council do not bind themselves to accept the lowest or any tender.

G. E. HANDLEY,
Engineer and Manager.

Council Offices,
Hunstanton, Norfolk.

June 2, 1948.

CITY OF MANCHESTER

(GAS DEPARTMENT.)

THE Gas Committee invites tenders for the work and materials required in the provision and erection of one Diesel engine-driven GAS COMPRESSOR at Bradford Road Gas-works.

General conditions, specification and form of tender may be obtained on application to the Commercial Manager and Secretary, Gas Department, Town Hall, Manchester, 2.

Sealed tenders in the envelope provided addressed to the Chairman of the Gas Committee and endorsed "Diesel engine-driven Gas Compressor," must be delivered at the Gas Office, Town Hall, Manchester, 2, not later than 5 p.m., Tuesday, June 22, 1948.

The Committee does not bind itself to accept the lowest or any tender.

PHILIP B. DINGLE,
Town Clerk.

Town Hall,
Manchester, 2.
June 1948.

CITY OF MANCHESTER

(GAS DEPARTMENT.)

THE Gas Committee invites tenders for the works and materials required in the RE-SHEETING AND REPAIRS to No. 2 GASHOLDER, Bradford Road Works.

General conditions, specification and form of tender may be obtained on application to the Commercial Manager and Secretary, Gas Department, Town Hall, Manchester, 2.

Sealed tenders in the envelope provided addressed to the Chairman of the Gas Committee and endorsed "Re-sheeting and Repairs to No. 2 Gasholder" must be delivered at the Gas Office, Town Hall, Manchester, 2, not later than 5 p.m., Monday, November 1, 1948.

The Committee does not bind itself to accept the lowest or any tender.

PHILIP B. DINGLE,
Town Clerk.

Town Hall,
Manchester, 2.
June, 1948.

ACCRINGTON DISTRICT GAS AND WATER BOARD

TENDERS are invited for the supply, delivery and erection, at the Board's Great Harwood Gas-works, of a four-lift SPIRALLY GUIDED GAS-HOLDER of 2 million cu.ft. capacity, with steel tank, the whole to be of riveted construction.

Full particulars, specification, conditions of contract and form of tender can be obtained from A. Harrison, M.Inst.G.E., Engineer and General Manager, General Offices, St. James' Street, Accrington.

Tenders, enclosed in plain sealed envelopes endorsed "Tender for Gasholder," should be addressed to the Chairman and Members, Accrington District Gas and Water Board, St. James' Street, Accrington, to be received not later than Monday, July 12.

The Board do not bind themselves to accept the lowest or any tender.

A. HARRISON,
General Manager.

General Offices,
St. James' Street,
Accrington.

June 1, 1948.

APPOINTMENTS VACANT

None of the vacancies in these columns relates to a man between the ages of 18 and 50, inclusive, or a woman between the ages of 18 and 40, inclusive, unless he or she is excepted from the provisions of the Control of Engagement Order, 1947, or the vacancy is for employment excepted from the provisions of that Order.

REPRESENTATIVES required already calling on Gas Undertakings to represent a firm with new Gas Appliances already introduced. Areas required: London; Midlands; South West; West; and North of England. Car is essential. To represent on commission basis. Reply to No. 9732, "GAS JOURNAL," 11, Bolt Court, Fleet Street, London, E.C.4.

OPERATORS and CONTRACT SUPERVI-SORS required for all types of carbonizing plant. State age, general and Technical education and experience, together with salary required. Apply in writing to W. J. JENKINS & CO., LTD., Beehive Works, Retford, Notts.

TOTTENHAM AND DISTRICT GAS COMPANY

APPLICATIONS are invited for the position of SHIFT SUPERINTENDENT at the Willoughby Lane Works of the above Company. Candidates should preferably have had experience on Woodall-Duckham, I.V.C.'s, C.V.'s, and carburetted water gas plant. The salary will be according to experience but not less than £450 per annum. Applications, giving full particulars of qualifications and experience, should be sent to the PERSONNEL OFFICER, Tottenham and District Gas Company, Woodall House, 658, Lordship Lane, Wood Green, N.22.

NEWPORT (MON.) GAS COMPANY

APPLICATIONS are invited for the post of METER AND COOKER INSPECTOR to take charge of the Meter and Cooker Repair Departments and supervise the meter collectors on the district.

Applicants must be competent to supervize the repairs of all types of meters up to a capacity of 6,000 cu.ft. per hour, and possessed of some experience in cooker repairs.

The commencing salary offered is £350 per annum.

Applications, stating age, qualifications held and experience, to J. F. RUST, M.Inst.Gas E., Chief Engineer, Newport (Mon.) Gas Company.
June 4, 1948.

BILSTON GAS LIGHT AND COKE COMPANY, LIMITED

APPLICATIONS are invited for the appoint-ment of TECHNICAL ASSISTANT AND RELIEF SHIFT SUPERINTENDENT to the above Company.

Candidates should have experience in the control of continuous vertical retorts and be capable of supervizing steam raising and other mechanical plant.

The successful applicant will be required to join the Company's pension scheme.

Applications, stating age, experience and salary required, and accompanied by the names of two referees, should be forwarded to the undersigned on or before June 26, 1948.

F. HARVEY,
Engineer and Manager.

Gas-works,
Ward Street,
Ettingshall,
near Wolverhampton.

COUNTY BOROUGH OF DARLINGTON

(GAS DEPARTMENT.)

JUNIOR ENGINEERS.

APPLICATIONS are invited from young men with engineering or chemical training and holding a Higher National Certificate or equivalent, for the position of JUNIOR ENGINEER. The persons appointed will be trained for the position of Shift Engineer.

Salary in accordance with Grade II, Miscellaneous Division of the National Scale of Salaries, commencing at £375, and rising to £420 per annum.

The successful candidates will be required to pass a medical examination.

Applications, endorsed "Junior Engineer," stating age, particulars of training, experience and qualifications, together with *copies* of not more than two Testimonials, to be delivered to the GAS ENGINEER AND MANAGER, Gas-works, John Street, Darlington, on or before Saturday, June 26, 1948.

NEW MILLS URBAN DISTRICT COUNCIL

(GAS AND WATER DEPARTMENT.)

TECHNICAL ASSISTANT.

APPLICATIONS are invited for the above position at a salary in accordance with Grade I of the A.P.T. Division of the National Scales (£390, rising by annual increments of £15 to £435).

Applicants should have had practical mechanical experience, and be thoroughly conversant with the control and operation of horizontal retorts and general gas-works practice. They should also be capable of performing routine duties connected with works laboratory and have had some drawing office experience.

Applications, stating age, marital state, qualifications and experience, together with a *copy* of one recent Testimonial and the names and addresses of two persons for reference, should be sent in sealed envelopes endorsed "Technical Assistant" to reach me at the Town Hall, New Mills, near Stockport, not later than Saturday, June 26, 1948.

D. H. NICHOLSON,
Clerk of the Council.

Amended advertisement.

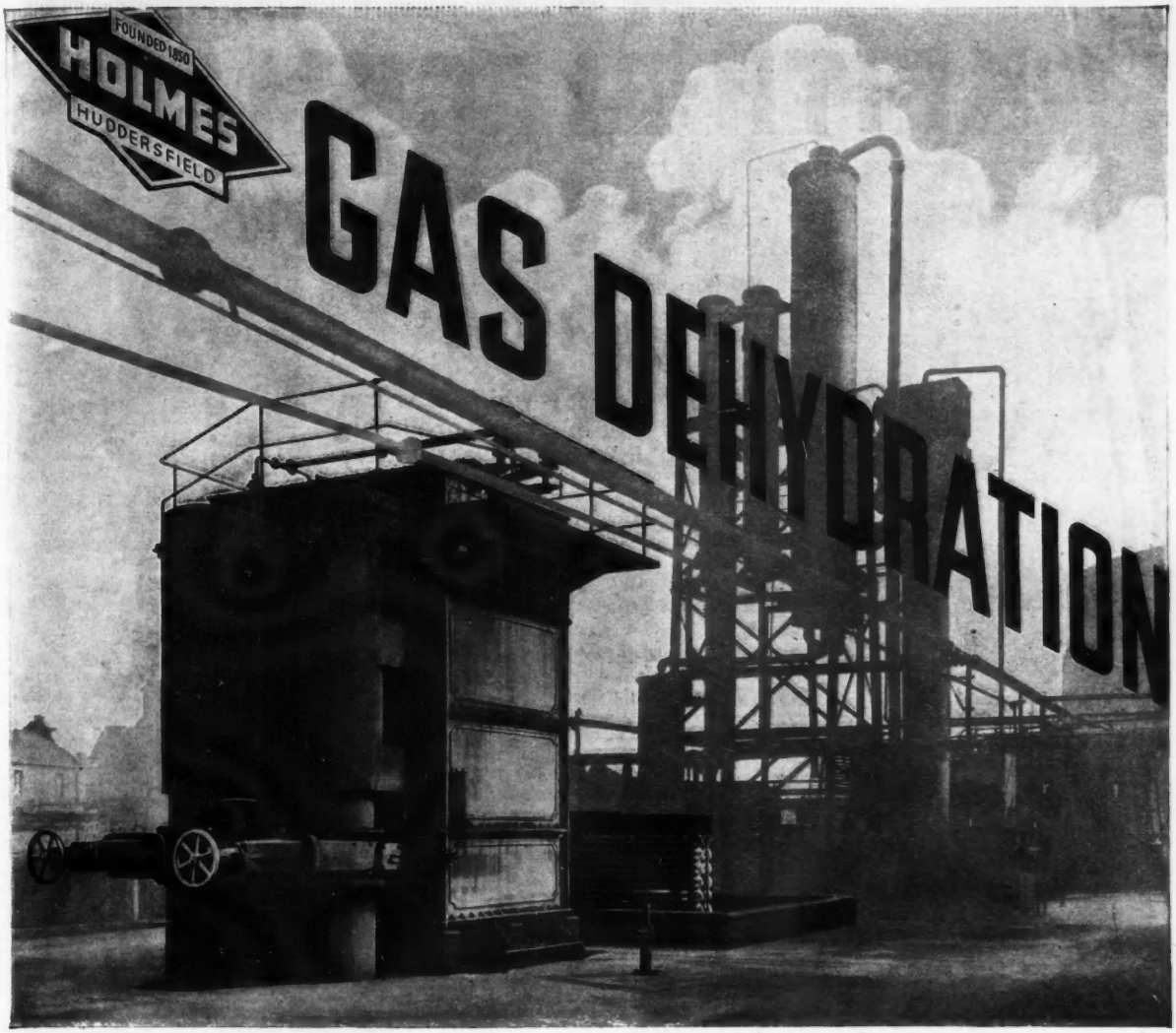
THE Colchester Gas Company require a CAR-BONIZING SUPERINTENDENT to take charge of a new continuous vertical retort house. Salary £500 per annum.

Applications, stating age, experience, and present engagement, should be sent to the undersigned.

Exempted from the Control of Engagement Order.

MAURICE L. SMITH,
Engineer and Manager.

The Colchester Gas Company,
Gas-works,
Colchester.



INSTALLATION AT LEA BRIDGE *By permission of D. C. Cross, Esq., M.Inst.C.E.*

Avoids

- ✱ INTERRUPTION OF SERVICE
- ✱ COSTLY CORROSION
- ✱ METER FAILURES
- ✱ SYPHON PUMPING

Since the War the construction of these important plants has recommenced and the total of installations now stands at **119**

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FANS *for every purpose*

for which fans can be employed profitably in or by the Gas Industry

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WE make all types of Fans—"High Efficiency" for boosting or exhausting gas up to 3 lbs. p.s.i. and for volumes from 5,000 to 1,500,000 cfph; Cast Iron and Steel-plate "Pressure" fans for up to 2 lbs. p.s.i. air blast to furnaces, forges, water gas plants, burner equipment, etc; "Turbo" fans for applications requiring up to 6 lbs. p.s.i.; "Centrifugal" fans for draught on boiler fires to ensure economical steam production, or for cold air douche to workers in retort houses, etc.; "Centrifugal" or "Axial-flow" fans for supplying ventilating air through ductwork; "Propeller" fans for moving air in volume for ventilating; "Propeller" fans on portable structures for cooling workers at furnace fronts; and "Tenaxe" fans for re-circulating high temperature gases and air in various types of heat treatment furnaces.

WHEN you need fans for moving air or gases give us an opportunity of making practical suggestions.

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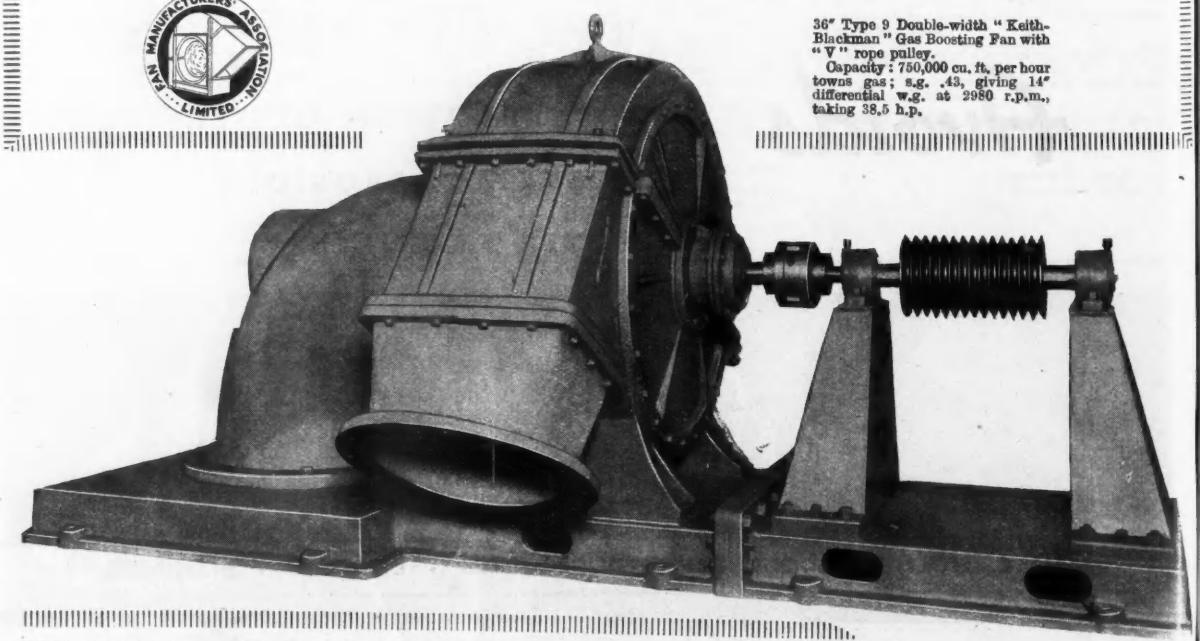
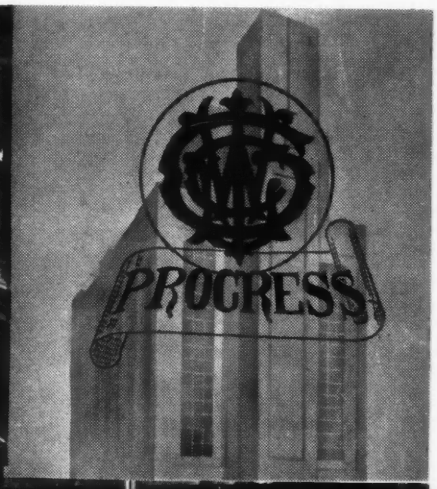
MANCHESTER, 4: 26 Corporation Street. Tel. No.: Blackfriars 4228. BIRMINGHAM, 2: 75 New Street. Tel. No.: Midland 0317-8.
LEEDS, 1: 40/41 Royal Exchange Chambers. TN: Leeds 27286. NEWCASTLE-ON-TYNE 1: 21 Mosley St. TN: Newcastle 22284.
SCOTLAND: 90 Mitchell Street, Glasgow, C1. TN: Central 7973. IRELAND: 7 Brunswick St. Belfast. TN: Belfast 21114.
SOUTH WALES: 127 Stanwell Road, Penarth, nr. Cardiff. TN: Penarth 249.

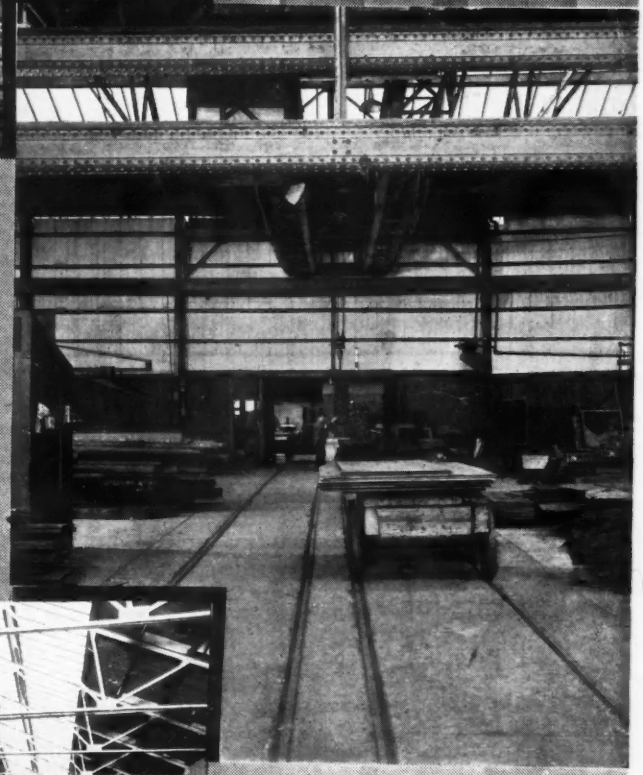
FAN MANUFACTURERS' ASSOCIATION LIMITED



36" Type 9 Double-width "Keith-Blackman" Gas Boosting Fan with "V" rope pulley.
Capacity: 750,000 cu. ft. per hour towns gas; s.g. .43, giving 14" differential w.g. at 2980 r.p.m., taking 38.5 h.p.

Printed by Straker Brothers Ltd., E.C.2, for WALTER KING LIMITED, 11, BOLT COURT, FLEET STREET, LONDON, E.C.4.—Wednesday, June 9, 1948.





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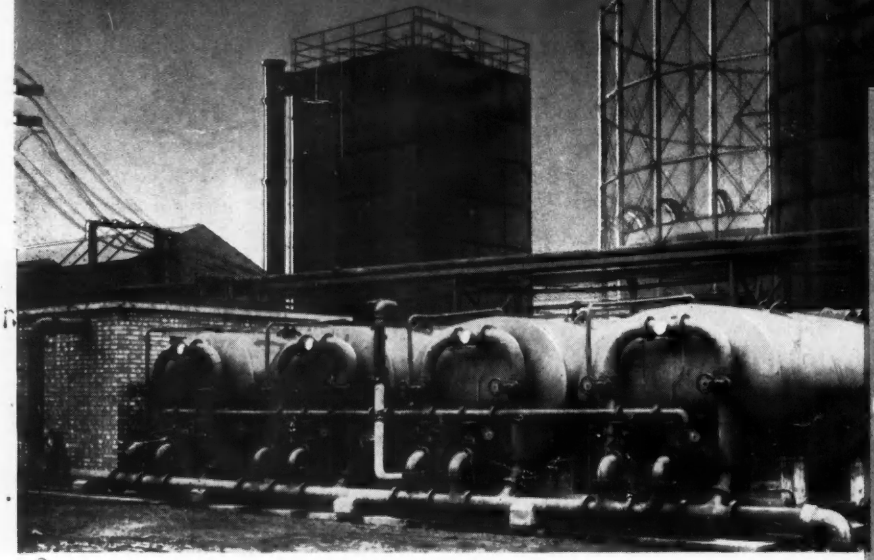
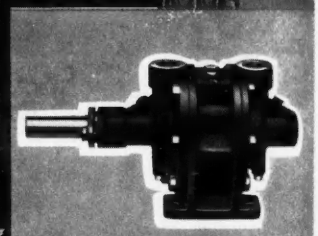
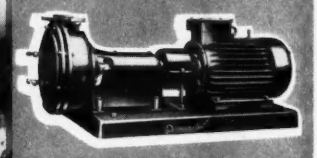
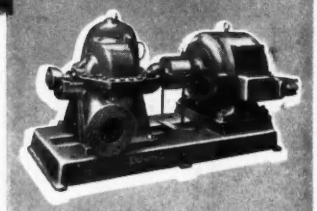
Pulsometer

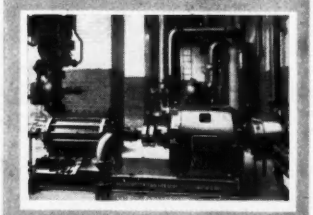
PUMPS AND FILTERS



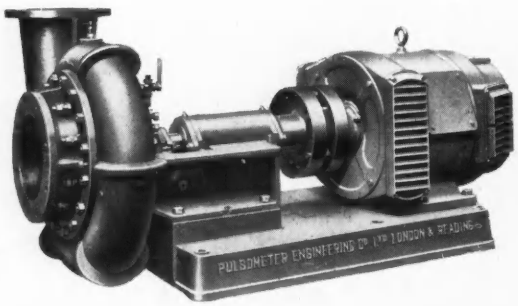


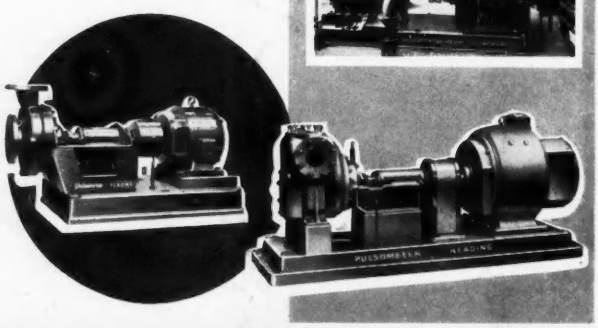






Centrifugal pumps for light and heavy oil and liquor transfer duties, Stoneware and pumps in special metals for handling acids and alkalis, circulating and washer duties, clean water and fire service and liquids containing abrasives





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